



A 12 Supply and Demand Analysis

By the end of this chapter you should be able to apply supply and demand analysis to factor and commodity markets. You will be expected to be able to:

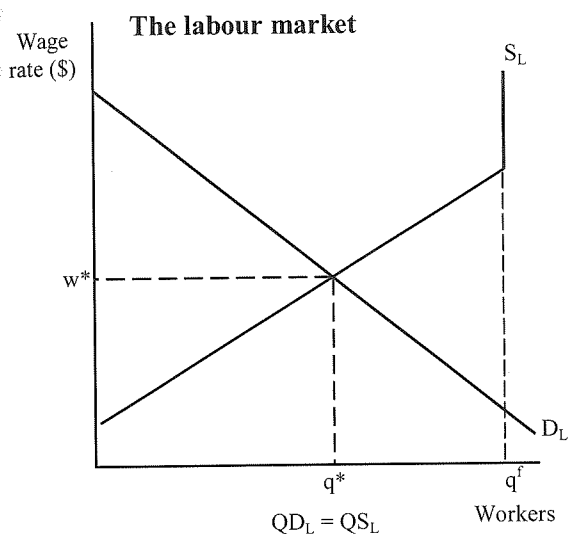
- analyse, using the concept of real wages, the effects of price level changes and controls in the labour market
- compare the incidence of a sales tax and a subsidy on a commodity that has a relatively inelastic demand with a commodity having relatively elastic demand
- illustrate the market for an internationally-traded commodity identifying exports and imports.

The Labour Market

The labour market is an example of a factor (resource) market. The equilibrium nominal wage (expressed in current dollars) and the level of employment are determined by the intersection of the demand curve for labour and the supply curve for labour in the labour market.

Demand for labour (DL) is a derived demand ie. the demand for workers is derived from the demand for the good or service they produce. The productivity of workers will also affect the demand for labour.

Supply of Labour (SL) is influenced by the age structure of the population, social attitudes to employment and the participation rate. It cannot go beyond the full employment level.



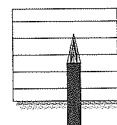
The labour market is in equilibrium at w^* , q^* . At the equilibrium wage rate there is no **involuntary unemployment**; that is everyone who is looking for a job can find one. This is because there is no surplus. But as we can see from the graph there will be **voluntary unemployment** of $q^f - q^*$. Workers do not volunteer for work because the wage rate is too low.

Real Wage Rate (w/p)

Real wage rate gives the purchasing power of wages. It is calculated using the formula:

Nominal wage $w \div$ price level p , as measured by the CPI. $\uparrow w \Rightarrow \uparrow QS_L$, but this could be **money illusion**. If p also increases, nobody is better off! In the long term ΔQS_L increases in response to a change in the real wage rate ($\Delta w/p$).

If wages rise faster than prices rise, real wages increase from w/p^* to w/p_2 , and the level of employment, the QD_L at the current wage



Define derived demand.

Suggest how the market for bakers will be affected in each of the following situations:

- demand for bread increases.
- productivity of bakers increases.
- the school leaving age increases.
- an increase in immigration.

Why does the SL become vertical at some point?

"When the labour market is in equilibrium there is no unemployment." Comment on this statement.

If the consumer demand for goods and services increases, which curve shifts, and which way?

The _____ curve shifts to the _____

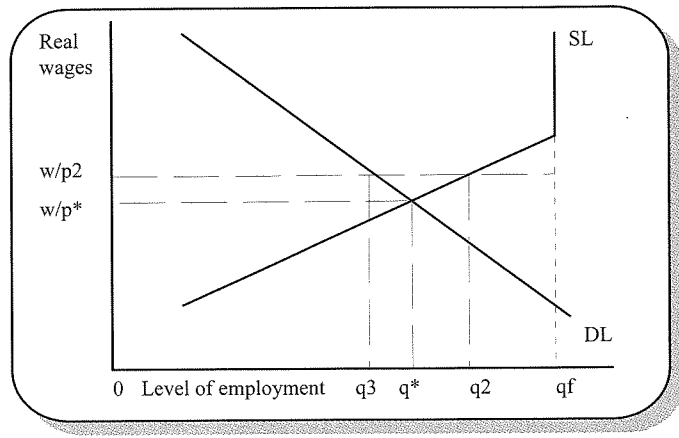
As a result of this change what happens to:

the wage rate? _____

level of employment? _____

level of voluntary unemployment? _____

rate, falls from q^* to q_3 . To establish the $\% \Delta w/p$ we subtract $\% \Delta p$ from the $\% \Delta w$. Thus if the nominal wage rate had increased by 5% at a time when the price level had increased 2% then the real wage rate will have increased by 3%.



Intervention in the Labour Market

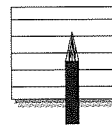
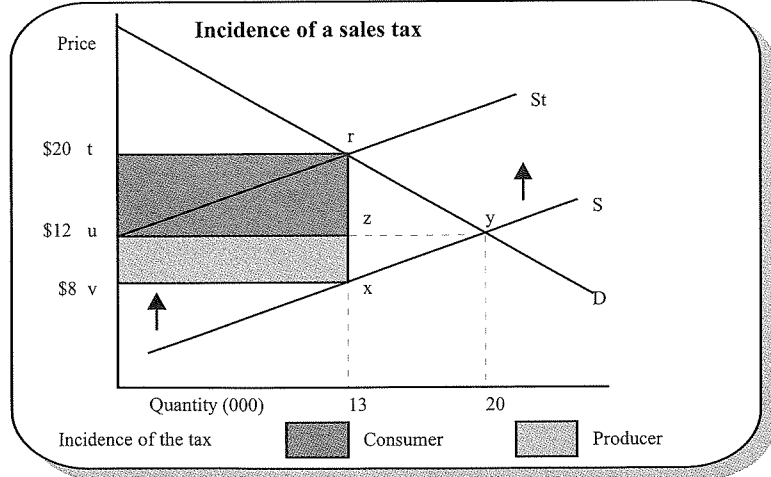
If the equilibrium wage is below subsistence level the government could intervene by imposing a **minimum wage rate**. As we have seen in Ch. 9 this minimum price will only be effective if the price is above equilibrium. If a minimum wage rate is imposed at w/p_2 , $Q_{SL} = q_2$ and $Q_{DL} = q_3$. There will be a surplus of labour created, or unemployment of $q_2 - q_3$. At present the minimum wage rate for workers over 20 years of age is \$7.50 per hour gross.

Unions and the Labour Market

Trade unions in the past were able to restrict the supply of labour by declaring a *closed shop* (that is where all workers at a work site must be a member of a particular union). This had the effect of increasing rates of pay.

The Incidence of Taxes and Subsidies

The **incidence of a sales tax** describes who actually bears the burden of the tax. In other words, what portion of the tax the producer or the consumer pays. As long as you know how to interpret the graph, the relative amounts can simply be read off the demand and supply graph. The key features are shown on the graph and explained on the next page.



Where w = the nominal wage rate and p = price level, complete the table:

$\% \Delta w$	$\% \Delta p$	$\% \Delta w/p$
10.0	10.0	
8.0	10.0	
1.0	1.8	

From the graph identify what has happened to: the level of employment _____

the level of voluntary unemployment _____

From the graph, at the **equilibrium** wage rate:

the wage rate = _____

the employment level = _____

voluntary unemployment = _____

At the **minimum** wage rate (w/p_2):

the wage rate = _____

employment level = _____

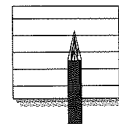
voluntary unemployment = _____

involuntary unemployment = _____

How can a trade union attempt to increase the wages of its members?

Define the incidence of a sales tax.

Explain how the graph shows the incidence of a sales tax.



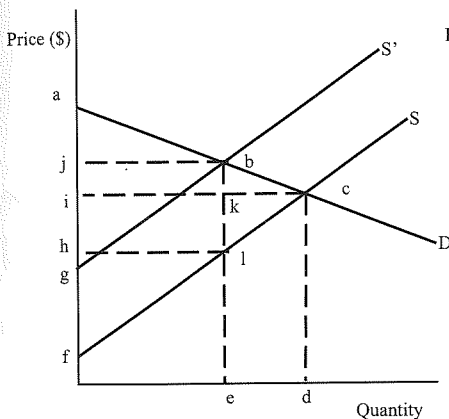
From the graph we can see that the original equilibrium price is \$12 (u) and quantity is 20 000. The effect of a sales (indirect) tax is to shift the supply curve vertically upwards from S to S'. The amount of tax imposed per unit is the vertical distance between the supply curves (r - x), \$12. The new equilibrium price paid by consumers is \$20 (t) and quantity is 13 000. What the producers actually received is \$8 (v) because the government takes \$12 per unit in tax. The total amount of tax revenue generated by the government is the area (rxvt), in this case \$156 000 (\$12 × 13 000).

- the incidence to consumers is the increase in price shown by the area (rzut), in this case \$104 000 (\$8 × 13 000).
- the incidence to producers is the difference in the price they originally received and what they now receive, shown by area (uvxz), in this case \$52 000 (\$4 × 13 000).
- Consumers are paying 67% of the tax (\$104 000 ÷ \$156 000 × 100) and producers are paying the remaining 33% (\$52 000 ÷ \$156 000 × 100). Thus the incidence of the tax falls more heavily on the consumers than on the producers.

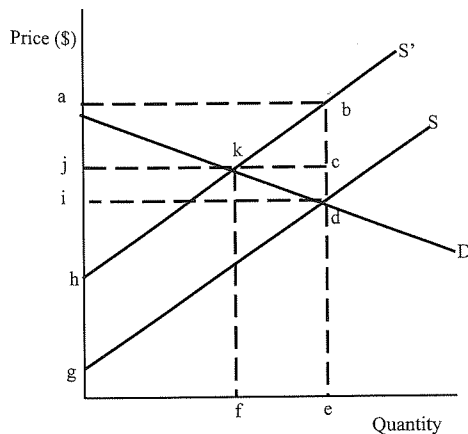
The incidence of a subsidy is who benefits from the government payment. The consumer's incidence will be the portion of the subsidy leading to a fall in price to the consumer, seen as the area jcdi in Graphs C and D below. The remaining area is the incidence to the producer.

Elasticity and the Incidence of Taxes and Subsidies

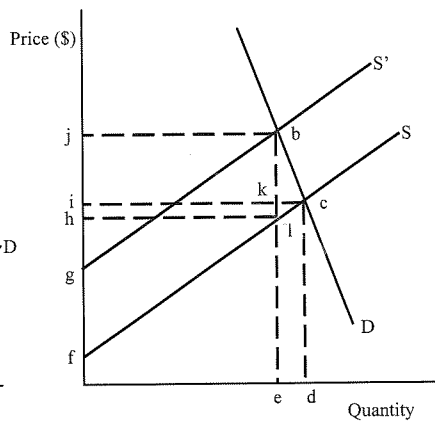
Graph A



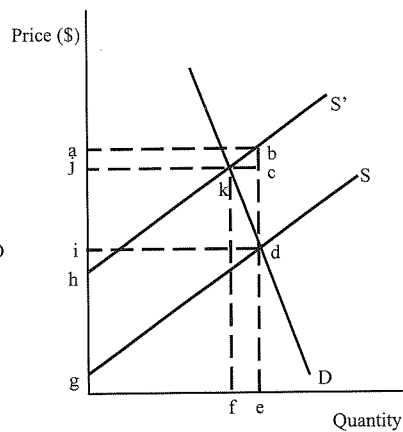
Graph C



Graph B



Graph D



Use the letters from Graphs A to D below to complete the following.

From Graph A and B, complete:

- original price \$ _____; quantity _____
- per unit amount of tax \$ _____
- new price \$ _____; quantity _____
- price producers will receive \$ _____
- price consumers will pay \$ _____
- total tax revenue \$ _____
- the incidence on consumers _____
- the incidence on producers _____
- the incidence falls more heavily on _____

Contrast the incidence of a sales tax for a good with relatively elastic demand with a good with relatively inelastic demand.

From Graph C and D, complete:

- original price \$ _____; quantity _____
- per unit amount of subsidy \$ _____
- new price \$ _____; quantity _____
- producers will receive \$ _____
- price producers will pay \$ _____
- total subsidy expenditure \$ _____
- the incidence on consumers _____
- the incidence on producers _____
- the incidence falls more heavily on _____

Contrast the incidence of a subsidy for a good with relatively elastic demand with a good with relatively inelastic demand.

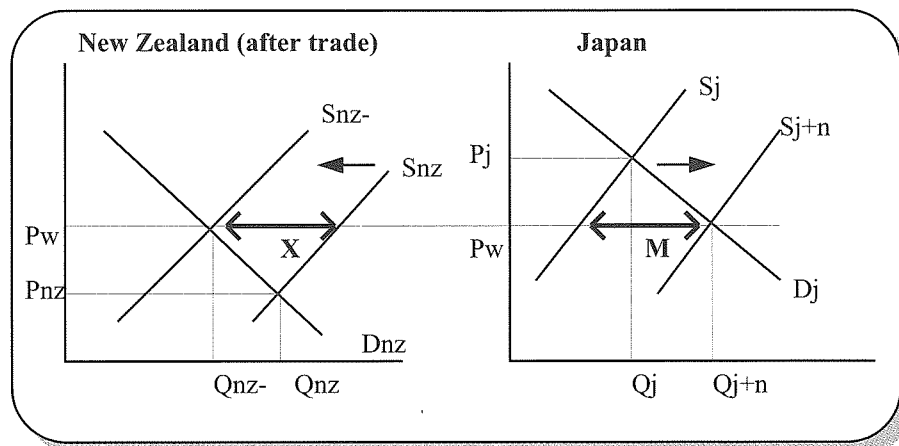
Inelastic Demand

Where a sales tax is imposed on a good with a relatively inelastic demand there is only a small drop in sales, and government is able to raise a large amount of tax revenue and suppliers will not suffer a large drop in sales. That is, the burden of the tax falls more heavily on the consumer if demand is relatively inelastic.

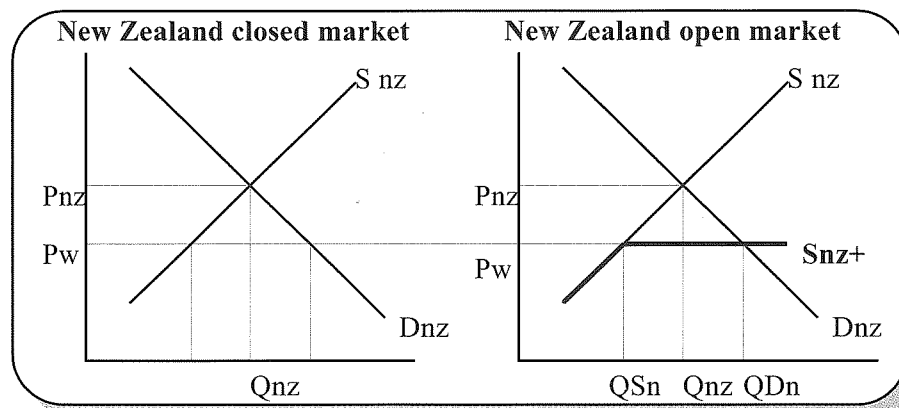
Elastic Demand

Incidence falls mainly on the supplier, and there is a large fall in sales. The government is unable to raise much revenue.

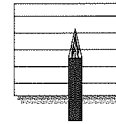
Internationally Traded Commodities



New Zealand is a small trading nation. In most cases our producers are "price takers" and have to sell their products at prices that are determined overseas. The world price (P_w) is established where world demand equals world supply. Where only two countries are illustrated, as in the graph above), P_w will be where the surplus available for export equals the shortage that needs to be imported in the other country.



In a closed market P_{nz} and Q_{nz} are determined where $D_{nz} = S_{nz}$. If world price (P_w) is below P_{nz} , and an open economy exists, Q_{nz} falls to Q_{Sn} because of the lower price. S_{nz+w} is shown as a horizontal line because as far as the local market is concerned there is an unlimited supply at this price. Domestic buyers will be able to buy more, with purchases of Q_{Dn} .



Why would government favour increasing taxes on petrol instead of cars?

How is world price (P_w) established in the situation where trade occurs between two countries?

Explain which country exports and which country imports, in the graphs alongside.

How is world price established in the situation where New Zealand is a price taker?

Explain what has happened to the following now that New Zealand has an open market:

(i) domestic supply

(ii) domestic demand

(iii) domestic price.
