Throughout the market iteration thus far, we have operated under the assumption of competitive markets, i.e. markets where only the forces of supply and demand set equilibrium price and quantity. In reality things are far more complex, as there are a number of elements which can offset and negate (= work against) freely operating market forces. Market intervention via controlling prices will have the effect of non-clearing markets with either an excess of supply or an excess demand as a result. We now look at each of these in turn.

- **Maximum prices (ceiling prices)**

  A **maximum price** – also known as a ceiling price – is when the price is set below the market clearing price level. This is a mechanism imposed by government primarily in order to increase availability – perhaps hereby increasing equality in society by permitting more people to afford the good. Notable examples have been war-time centralised prices, extreme measures in times of high inflation and when prices are set centrally in planned economies. In all cases there are two major side-effects. The first effect is an **excess of demand** which in turn will create queues and second-hand selling, i.e. **black (parallel) markets**.

  - **Reasons for maximum prices**

    The main reason for governments setting a maximum price is for reasons of **equity**, which means fairness in the distribution of goods. Many countries set maximum prices on goods which are considered basic necessities, such as tortillas in Mexico and cooking oil in Indonesia. The aim of government is to provide broad (as in “across society and social groups”) access and
availability of such staple goods for low income groups. The issue with inner city apartments is similar; income groups such as nurses, store clerks and librarians could not possibly afford the market based rents in cities such as Stockholm and New York.

- Diagrammatical analysis of maximum prices

Let us assume that a government wishes to set a limit on the rents of inner-city housing – something my home country, Sweden, does in the case of apartments in Stockholm. Since a maximum price only has effect when set below the market clearing price, the result will be an increase in quantity demanded and a decrease in quantity supplied. The free market supply and demand result in the price \( P_{\text{mkt}} \) and the quantity \( Q_{\text{mkt}} \) in figure 15.1. (SEK in the figures means “Swedish crowns”.)

**Figure 15.1 Maximum price on inner-city rents, Stockholm**

- Outcome of maximum prices

“In many cases rent control appears to be the most efficient technique presently known to destroy a city—except for bombing it.” (Assar Lindbeck, famous Swedish economist in “The Political Economy of the New Left, 1972, page 39)

As quantity demanded is in excess of quantity supplied at \( P_{\text{max}} \), (figure 15.1) there will be a goodly portion of pent-up demand amongst consumers. If no limit is set on the amount of housing one can rent, there is an incentive to rent more apartments than one can use in order to rent out the rest on a parallel (black) market. The black market price – called sub-letting rent – would be at a price of up to \( P_{\text{B.M.}} \), since this is what consumers would be willing to pay for the quantity of \( Q_S \) according to the demand curve. The red quadrant between the minimum reselling price (the official maximum price of \( P_{\text{max}} \)) and the black market price (\( P_{\text{B.M.}} \)) is the possible black market. Note that the black-market price of \( P_{\text{B.M.}} \) is based on the assumption that all of \( Q_S \) housing hits the parallel market! Hence the word “possible” above.

The consequences of imposing maximum prices are the queues and resulting black markets. This is something that the government will have to deal with and the most common form of solution has been to limit the quantity per person by either a rationing system, or a queuing system. Rationing is achieved by setting a limit to purchases and such instruments as coupons for coffee and meat, while a queue system is basically done by instituting a ‘first come – first served’ system often found on markets for rent-controlled inner-city apartments. Note that it depends very much on the good in question which of these are possible for government to impose – a rationing system works better for coffee than for housing.

---

1 The queue system works something like this: After giving birth, the happy mother takes the infant down to the official registrar for apartments and puts the toddler in the queue. 20 to 25 years later, the young man/lady might get an apartment. I’ve had numerous 18 year old students who had been in the queue all their lives. Very patient people, the Swedes. Maybe that’s why they drive Volvos.
Effect of maximum prices on stakeholders

Since the price of the good – here, inner-city apartments – decreases one would expect consumers to be better off and suppliers to be worse off. This is, well, almost true. **Figure 15.2** shows how the maximum price (rent ceiling) results in a redistribution and loss of societal surplus.

- **Consumer surplus** is originally areas A, B and E. The maximum price means a loss of area E but a gain of area C.
- **Supplier surplus** is originally areas C, D and F. Due to a maximum price, suppliers lose areas C and F.
- **Consumers** can be considered better off since the maximum price transfers a portion of supplier surplus (area C) to them which offsets the loss of consumer surplus (area E).
- **Suppliers** are worse off since they lose supplier surplus areas C and F.
- The net loss of consumer surplus and supplier surplus (e.g. societal surplus) are areas E and F. This shows the efficiency loss of the maximum price – the **deadweight loss**.

**Figure 15.2** Consumer and supplier surplus due to a maximum price (rent ceiling)

<table>
<thead>
<tr>
<th>Original consumer surplus</th>
<th>Original supplier surplus</th>
</tr>
</thead>
<tbody>
<tr>
<td>A + B + E</td>
<td>C + D + F</td>
</tr>
</tbody>
</table>

The lucky ones who manage to get hold of the good (apartments) will be able to re-sell or sub-let the apartment and earn profits at the expense of others\(^2\). **Areas A and B** in **figure 15.2** also represent the potential black market for apartments (see **figure 15.1**). Any apartments rent out at a price of \(P_{\text{B.M.}}\) means that those units would have a corresponding decrease in consumer surplus. Just imagine if all the apartments were sold on the black market – **areas B and C** would be profits for the renters and remaining consumer surplus would be **area A**.

Rent ceilings would create a disincentive for apartment owners to keep the apartments on the market (see “A little depth: rent controls…” further on) and they would look for producer substitutes such as renting out to businesses or storage. This would decrease the supply of apartments and raise the black market price further.

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\(^2\) In fact, “lucky ones” is not the right term. The correct term would be “those with lower opportunity costs of standing in line”. Just think about who is selling black market tickets and who is buying them! Correct: my kids stand in line for me and then sell me the Rammstein tickets at a markup. They have more time than money – I have the reverse, so my opportunity costs are greater than theirs. (In fact, my kids are so wonderful that they give the tickets to me as a present (!) but I’m trying to make a point.)
Another effect would be that apartment owners would provide minimum possible upkeep, renovation and repairs. This would destroy capital over time and possibly result in "slumification" in areas with rent control.\(^3\)

For inner-city rents it is probable that maximum prices cause immobility on the labour market as it might be quite difficult to get the same low rents in other cities. In essence, a person finding a job in another city might not be willing to move.

\(^3\) I recommend "Economic Facts and Fallacies" by Thomas Sowell, pages 23 – 36 for an excellent romp through what is in effect a case study of unintended consequences.
One thing I make sure my people know is that I am training them not to by my equal but to be my superior, and I always succeed. I encourage them to go off to university after graduation and return to straighten me out. Many of them do. One young lady, Sara, came for a visit to discuss how price elasticities can explain the limited supply of inner-city housing. This is HER story.

“When a maximum (ceiling) price is put on desirable inner-city housing, there will be an excess of market demand, Q₁ to Q₂ in the diagram”, explained Sara. “Right?”

“Yupp”, I said, “but what’s with the new supply curve?”

“Well, it is foreseeable that landowners over time simply don’t feel that the rent is worth it, and would take rooms and areas off the housing market.”

“For what?! I mean, better to at least get something for it!”

“Ah, but you are forgetting the opportunity costs! These rooms, attics and other space might be better used for other things; office space, ateliers, gyms or simple storage. The maximum price governs living area, not other activities!”

“Hmmm, OK, I’m with you on the “shift” part, but what’s the “swivel” and thus increase in PES?”

“Simple”, said Sara with that special smile young women reserve for old men who aren’t quite with it. “As the owners have converted some of the available floor area into other uses, there are now an increased amount of producer substitutes available! Should the price ceiling be lifted, suppliers will be able to quickly convert floor space back into living areas for rent. We assume that demand is the same, which means that full-out supply of rooms would be as before; at Pₘₐₓ and Qₘₐₓ.”

I thought this was a pretty cool use of PES. Thanks Sara. Incidentally, all of you may feel perfectly free to excel beyond my level and thereupon come and educate me! Welcome.

**Figure 15.3 Effect of rent controls in LR**

In the long run (LR), owners of apartments and housing space will convert free space into other uses – e.g. producer substitutes. This decreases supply at all levels up to what the free market price would be, Pₑ. PES has increased. Excess demand increases to Q₁ to Q₂, and the black market price increases to PₑMₑ₂.

- **Attempts at solving market disequilibrium in maximum price situation**

  There is also the possibility of using market forces to move back to equilibrium. Let us look at two general possibilities; shifting supply or demand for inner-city Stockholm housing where a maximum price has been set. In figures 15.4a and b, the
maximum price creates an excess demand of $Q_s > Q_d$.

**Figure 15.4 Possible solutions to the housing shortage**

**Fig. a) Increasing supply**

A subsidy and/or government supply of new housing increases supply, removing the excess demand of $Q_s < Q_d$.

**Fig. b) Decreasing demand**

Government inducements for substitutes to inner-city apartments lowers demand, removing excess quantity demanded.

The government could subsidise cheap inner-city housing by offering low cost loans to building companies or by offering incentives for city councils to increase the amount of apartments. This would shift the supply curve from $S_0$ to $S_{subsidy}$ in **figure 15.4a**, which would do away with the shortage of housing – and the black market.

Alternatively, government could offer any number of incentives for people to forego inner-city living by enhancing the alternative (= outer city areas), which would lower demand for city housing. For example, increased/improved transportation to outer city areas, tax benefits for those who commute, or even by increasing certain inner-city specific taxes – say parking fees and traffic fees – which are all ways for government to change citizens’ living preferences. This is illustrated in **figure 15.4b**, where the decrease in demand ($D_0$ to $D_1$) lowers the black market price to the official maximum price, thereby obliterating the excess demand for inner-city housing.
This scenario is shown in Figure 15.5. The initial supply curve is $S_0$ and is perfectly vertical (demand is completely price inelastic in correct economic jargon) at 50,000 seats. At that price, there would be a possible black market created by the excess demand ($A \otimes B$) and the high demand is an incentive for re-selling tickets on the 'second hand' market. This is shown by the shaded area I, which is given by the intersection of the original supply curve and the demand curve. One can say that anyone fortunate to get hold of a (first hand) ticket would be able to resell it at the black market price of $P_{B.M.}$ (Note that this is the possible black market price and not necessarily an equilibrium price.)

By setting the original price ($P_0$) below the market equilibrium ($P_{B.M.}$), a ceiling (maximum price) was created, causing an excess of demand ($A \otimes B$), i.e. a shortage of 50,000 tickets.

Putting the pieces together; “Born again...” continued

This scenario is shown in figure 15.5. The initial supply curve is $S_0$ and is perfectly vertical (= demand is completely price inelastic in correct economic jargon) at 50,000 seats. At that price, there would be a possible black market created by the excess demand ($A \otimes B$) and the high demand is an incentive for re-selling tickets on the 'second hand' market. This is shown by the shaded area I, which is given by the intersection of the original supply curve and the demand curve. One can say that anyone fortunate to get hold of a (first hand) ticket would be able to resell it at the black market price of $P_{B.M.}$ (Note that this is the possible black market price and not necessarily an equilibrium price.)

By holding an additional concert, the organisers have increased the supply of tickets from $S_0$ to $S_1$. This should hopefully result in the market equilibrium price of $P_0$ and destroy any black market in the making. One can also see how the total revenue (price times quantity) increases from area II to area II + III. One might say that this move has swept the market out from under the ticket scalpers’ feet.
Minimum prices (floor prices)
Another example of government intervention on markets is the establishing of minimum prices. While this has sometimes been applied generally to all goods in an economy, it is far more common for specific markets to be targeted, perhaps the most obvious being agricultural goods and labour markets. A minimum price sets a ‘floor’ under which the market price is not allowed to go.

**Reasons for minimum prices**
The intention of minimum price is to protect and aid certain suppliers; a minimum price on agricultural goods will guarantee farmers what government considers an acceptable income, while minimum prices on labour – i.e. minimum wage – would benefit those supplying their labour. In setting the minimum price on a good, the government is attempting to benefit society – an outcome that is often not the case.

**Diagrammatical analysis of minimum prices**
Government intervention on agricultural markets is often motivated by wanting to preserve a landscape or a traditional way of life by aiding farmers in keeping an equitable (= fair) standard of living, e.g. similar to that in other sectors in society. By setting minimum prices on agricultural goods, governments can even-out income differentials (= differences) by guaranteeing that farmers will receive a certain price for their goods. In doing this, the government puts the market function out of order – in essence by guaranteeing that farmers will get a minimum ‘fair’ price for their produce.

**Figure 15.6 Minimum price on grain – costs and revenue**

![Diagram showing minimum price](attachment:figure15.6.png)
A price support scheme simply means that the government agrees to purchase the excess at the agreed minimum price. In figure 15.6a), the price rises from $P_{\text{mkt}}$ to $P_{\text{min}}$ and quantity demanded decreases from $Q_{\text{mkt}}$ to $Q_{\text{D}}$. The total excess amount of grain is $Q_{\text{D}} - Q_{\text{S}}$, which the government would have to buy at a price of $P_{\text{min}}$. Total government expenditure is thus the orange quadrant. Producers' total revenue, figure 15.6b, increases by the yellow 'boomerang shaped' area. One should mention that other costs linked to the minimum price scheme will arise, such as administrative costs, storage costs, and transportation costs – an estimated 60% of the total cost of the European Union's (EU) Common Agricultural Policy (CAP) paid by taxpayers went to storage and administrative costs. Anyhow, the government portrayed in our example now has a few hundred thousand tonnes of grain to deal with. Now what?

- **Outcome of minimum prices**

Some of the most wasteful acts in society, tragically enough. Often agricultural surpluses have simply been stored in warehouses, resulting in “grain heaps”, ‘beef mountains’ and ‘wine lakes’ which nobody seems quite sure what to do with. In many cases the surplus has been burnt, sold on other markets (see ‘dumping’), or even sold back to farmers at a fraction of the minimum price – which was then often used as cattle feed to produce more butter and beef… I have to be careful here. My students tell me I have a tendency to get very loud and froth at the mouth when I get to government involvement in agricultural output. Suffice it to say that many of the minimum price schemes used in agricultural policies have historically been very wasteful, since suppliers have often produced too much, consumers have paid unnecessarily high prices and developing countries have seen their markets disrupted by excess produce dumped on their countries. We will return to the highly inflammatory debate on agricultural policies in Chapters 65 and 84. (Marcia: be wary of my use of tenses.)

- **Effects of minimum prices on stakeholders**

The price rises and the consumer pays a higher price – obviously consumers are getting a bad deal. How bad? If we follow figure 15.7 we again will see both redistribution issues and allocative losses:

- **Consumer surplus** is originally areas A, B and D. The minimum price means a loss of areas B and D.
- **Supplier surplus** is originally areas C and E. Due to a minimum price, suppliers gain area B.
- **Consumers** can be considered worse off since the minimum price transfers a portion of consumer surplus (area B) to suppliers.
- **Suppliers** are better off since the loss of supplier surplus (area E) is more than offset by the increase in supplier surplus (B).
- The **net loss of consumer surplus and supplier surplus** (e.g. societal surplus) are areas D and E. This shows the efficiency loss of the minimum price – the **deadweight loss**.

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5 My IB2’s recently banned me from using any type of energy drink during school hours – and received strong support from colleagues in adjacent (= nearby) rooms. I fear coffee and sugar are next. That leaves only my tequila and whiskey shelf. Oh well.
There are, once again, additional inefficiencies and re-distribution effects as a result of minimum prices:

- The consumers are also taxpayers! The total expenditure for consumers is the area \( P_{\text{min}} x Q_D \) but since the repurchasing scheme is funded by taxpayer money the total cost must include the net cost to government.
- There additional costs of administration, storage and transportation can mean considerable opportunity costs.
- If the government or suppliers dump the excess grain on the world market the result is often that the world price decreases. This can have severely harmful effects on developing countries which are dependent on exports of primary goods. Basically the effect is to redistribute income from poor people in poor countries to rich people in rich countries.

- Attempts at solving market disequilibrium in minimum price situations

Apart from buying up the excess and destroying it or selling it at below production costs, what can governments actually do to correct this oversupply? How about…paying farmers not to produce? No that sounds insane. Of course, this is exactly what the Common Agricultural Policy (CAP) in the European Union was doing until 2009 – farmers were basically paid a sum for setting aside fields to decrease oversupply. This “set-aside” or “fallow-field” policy was subject to so much criticism from EU citizens and non-government agencies that it was abolished in 2009.⁶

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⁶ See the European commission at [http://ec.europa.eu/agriculture/healthcheck/index_en.htm](http://ec.europa.eu/agriculture/healthcheck/index_en.htm)
 Many countries’ governments impose a minimum wage via legislation, while many other countries have a de facto (= actual) minimum wage through the influence of strong unions and centralised wage agreements with employer organisations. The reasoning behind minimum wages is that weaker members of society (e.g. workforce) need support; unskilled labourers, young people entering the labour market, people with little job experience, minority groups, etc. There is also, once again, an element of attempting to even-out income differentials in society. Whatever the case, the market for labour is similar to the market for goods and services, which can be seen in figure 15.8, and shows the effects of a minimum wage.

The supply of labour ($S_L$) shows the propensity of the labour force to accept jobs at given wage rates, while the demand for labour ($D_L$) shows the willingness of firms to hire at given wage rates. Equilibrium wage on a perfectly free market would be $P_{t_e}$ and the amount of people employed would be $Q_{t_e}$. A minimum wage above the market equilibrium means that more people offer themselves on the labour market, shown by the increase from $Q_{t_e}$ to $Q_{t_s}$. At the set minimum wage of $P_{t_{min}}$, firms’ demand for labour decreases from $Q_{t_a}$ to $Q_{t_b}$. This strongly resembles the outcome in the previous example; there is a surplus of labour, otherwise known as an increase in unemployment, shown in the diagram as the distance from $Q_{t_b}$ to $Q_{t_s}$.

QUESTIONS:

1. What would happen to the wage rate if the demand for labour increased so that the demand curve intersected the supply curve somewhere below $P_{t_{min}}$?
2. Same scenario as in question one; what would happen to the level of unemployment?
3. What would happen on the labour market if the minimum wage rate were lowered?
4. What would happen on the labour market if demand for goods and services in the economy increased? (Hint; “derived demand”.)

The effects of minimum wages are the subject of a very hot political debate. Defendants of minimum wages argue that many labourers would otherwise be powerless on the labour market since firms could set wages at close to existence minimum for weak labour groups. Opponents argue that minimum wages add to unemployment and lead to inefficient labour markets, resulting in sub-optimal resource allocation. We will look into this in greater depth in Chapter 50.
POP QUIZ 15.1 MAXIMUM AND MINIMUM PRICES

1. Using diagrams, explain what happens in terms of optimal resource allocation when a minimum or maximum price is put on a good.

2. Explain why a government cannot put a maximum price on a good without other measures. Illustrate your answer with an appropriate diagram.

3. In the same diagram as in question 2, show total government costs of the minimum price scheme. Are these the total costs to government of the scheme?

4. A government institutes a minimum price scheme for agricultural goods. What are the likely effects on farmers’ incomes? Use a diagram and show total income for farmers.

(About 2 – 3 pages for the HL section.)

HL extensions

xx
xx
- Calculations...max prices
xx
xx
- Calculations...min prices
xx
xx
Summary and revision

1. A maximum price (also “ceiling price”) is a government set price above market equilibrium price. The intention is to increase wider availability of the good.

2. A maximum price leads to a decrease in price and thus an increase in quantity demanded and a decrease in quantity supplied. The initial result is an excess demand.

3. Governments can attempt to countermand the excess demand via a queuing or rationing system.

- Lower price for consumers ($P_{\text{mkt}}$ to $P_{\text{max}}$)
- Decreased quantity on market ($Q_{\text{mkt}}$ to $Q_{S}$)
- Excess demand ($Q_{S} \rightarrow Q_{D}$)
- Possible black market (A and B)
- Increase in consumer surplus (C)
  - Decrease in consumer surplus (E)
- Decrease in supplier surplus (C and F)
- Remaining supplier surplus (D)
- Net loss of societal surplus (E and F) is the deadweight loss

3. Governments can attempt to solve market disequilibrium caused by maximum prices by
   a. Subsidising the good (to increase supply and decrease excess demand)
   b. Lowering the price of a substitute, for example via subsidies (to decrease demand and excess demand)
5. **A minimum price** (also “floor price”) is a government set price above market equilibrium price. The intention is to provide certain societal groups with an equitable standard of living.

6. A minimum price leads to an **increase in price** and thus an increase in quantity supplied and a decrease in quantity demanded. The initial result is an **excess supply**. Government needs to remove the excess supply via a re-purchasing scheme.

7. Other effects are **costs to taxpayers** of the repurchasing scheme and **possible dumping** – i.e. selling the excess on foreign markets at below the costs of production.

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**Diagram:**
- Higher price for consumers ($P_{\text{mkt}}$ to $P_{\text{min}}$)
- Increased **quantity supplied** on market ($Q_{\text{mkt}}$ to $Q_S$)
- **Excess demand** ($Q_D \rightarrow Q_S$)
- **Decrease in consumer surplus** ($A$ and $F$)
- **Remaining consumer surplus** ($A$)
- Increase in **supplier surplus** ($B$)
  - Decrease in supplier surplus ($F$)
- Net loss of societal surplus ($E$ and $F$) is the **deadweight loss**
- **Cost of minimum price scheme** ($E$, $F$, $G$, and $H$)
- Increase in **suppliers’ revenue** ($B$, $E$, and $H$)

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4. Another common form of minimum price is **minimum wage**. This is set above the market equilibrium price for labour in order to guarantee low-income groups a minimum income. This can in fact result in a **higher unemployment rate**.

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**Diagram:**
- $P_L$ (wage rate)
- $Q_L/t$ (millions of hours/year)
HL extensions (Marcia: one page here)
xx
xx
  • Calculations...max prices
xx
xx
  • Calculations...min prices