

Carrier bags: minimum pricing and the effect on consumers

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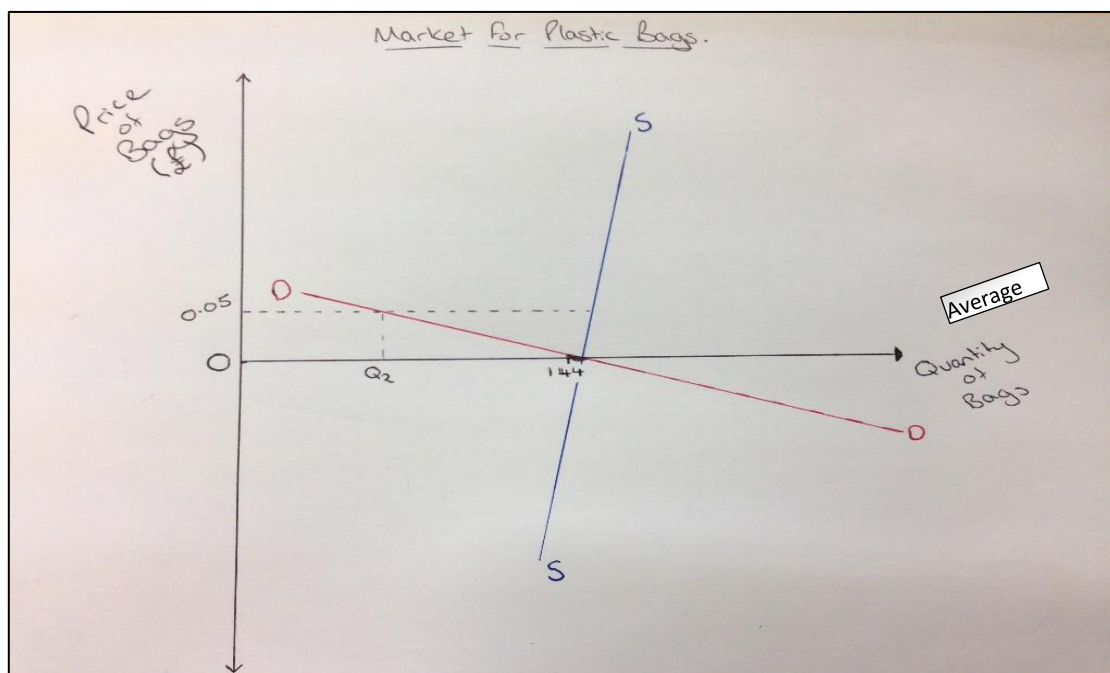
Introduction:

In the UK it is estimated that only 1 in 200 plastic bags are recycled, leaving the rest to go to landfill sites or to become litter (ReUselt, 2014). Putting this into perspective, supermarkets issued 8 billion carrier bags last year. As of the 20th of October 2014, the Scottish Government has implemented a new minimum price of 5p per disposable carrier bag provided (BBC, 2014). The revenue received from this minimum price will be similar to Wales's legislation, in that the firms are encouraged to reallocate revenue back into society through charities. The aim of this new legislation is to decrease consumption of carrier bags and increase the use of reusable bags. This has already been seen to be effective in Wales and Northern Ireland, with the use of carrier bags in food retail dropping up to 96% in some areas of Wales (Wales.gov), whilst other sectors also show significant reductions in the use of plastic bags. It has been so successful that Germany, Belgium and other EU countries have copied this legislation. The definition of disposable or one-use bags will be that they are only used once. By drawing on economic models, this essay aims to show the impact this legislation will have on consumers. However, it will negate the effect that the

money collected by this new minimum price will have on its redistribution back into the society, as the effect would be very difficult to gauge on an individual's utility.

Minimum price effect:

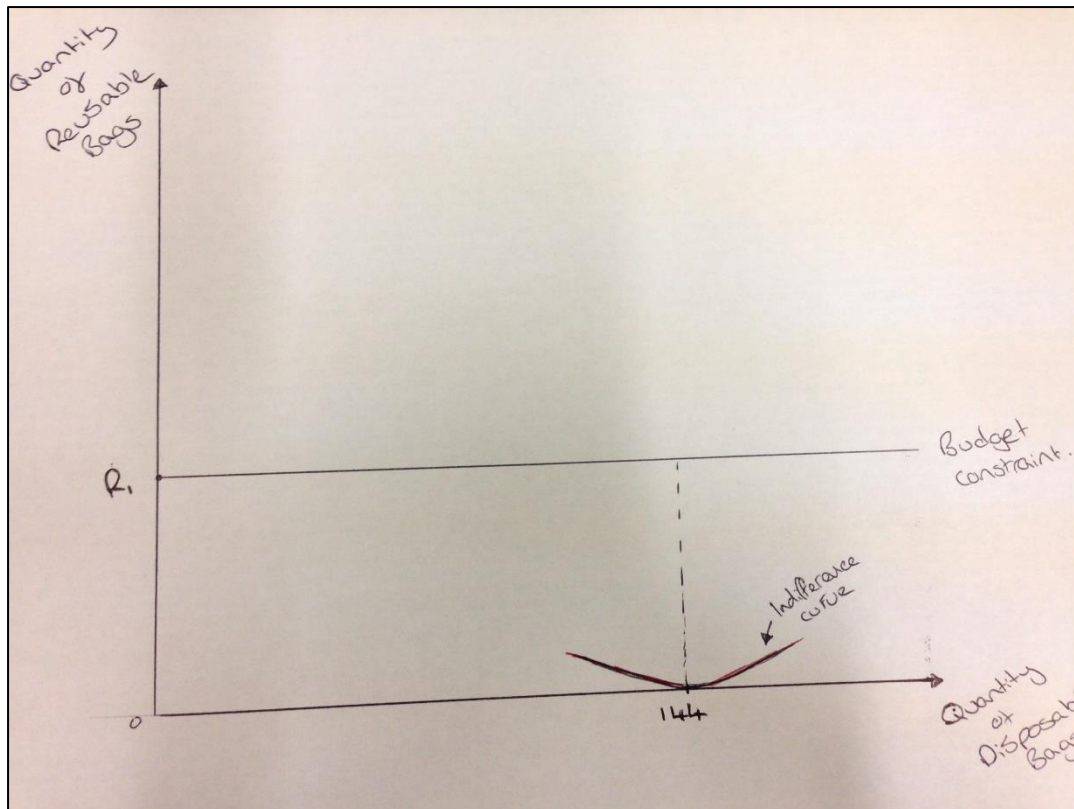
Plastic bags are one of the main visible aspects of litter – plaguing the countryside/ivers, they damage the environment in their production, their creation and their destruction. In 2006 Greenpeace did a survey regarding the production of plastic goods, and the results were shocking. Of the total amount of plastic produced annually, almost 70% of it ends up in the oceans, eventually sinking to the sea floor where it could take thousands of years to degrade completely (UNEP, 2006). It is therefore unsurprising that the government, after some pressure from campaigners, have implemented this minimum price. Using the economic model for minimum pricing, it can be demonstrated what effect this minimum price will have on the quantity demanded.



This diagram illustrates that, due to the price of demand being elastic, a small change in price has a large impact on the quantity supplied. This causes an excess of supply. Both demand and supply pass through 144 as this is the average bags used per individual per annum (ReUseIt, 2014). It also clearly shows that the price change will have a large impact on how many disposable carrier bags individuals will use, with the average quantity of one-use bags dropping from 144 to Q2 as price rises to £0.05. This will therefore lead on to have an impact on the amount of utility gained from consuming/using disposable bags. Using data gathered from UK governmental website (Gov.uk, 2014), it is estimated that we use around 10 bags per week per household. We can also assume that there is a percentage of the population that use both disposable and reusable bags when doing their shopping. Using a general approximation an indifference curve, before the minimum price, can be made for the general public.

Effect on utility using indifference curves:

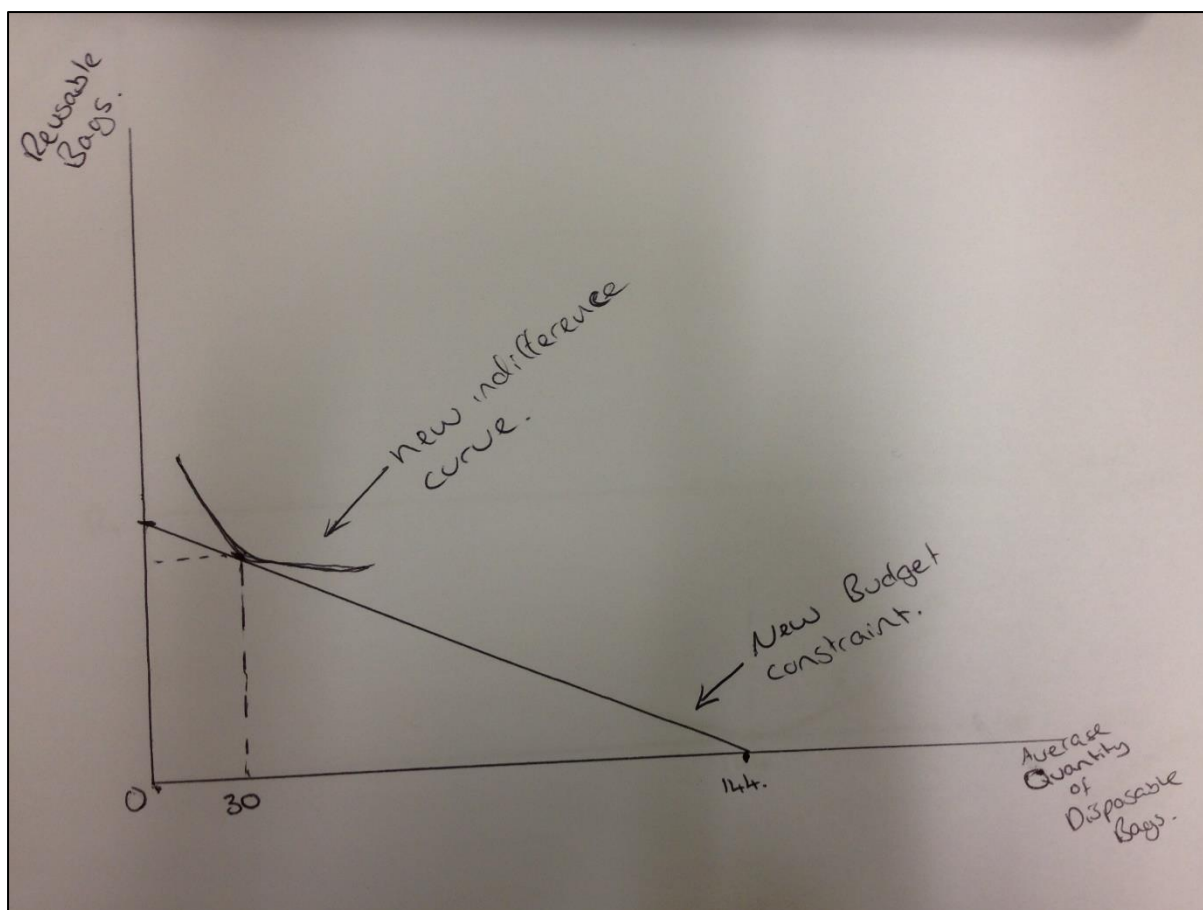
Indifference curves are different bundles or collections of two goods representing the same utility (satisfaction). The following is an example of an indifference curve for the average person/shopper before the minimum price.



Opportunity cost is the sacrifice of the next best alternative good. This is caused by scarcity of resources which causes us to make decisions. However, in this case, as disposable bags are free, individuals may consume virtually limitless amounts leading to the budget constraint being solely based on reusable bags (e.g bags for life) and is consequently a straight horizontal line. Another factor - due to the almost boundless amount of bags which may be used - is that a utility-maximising individual would only consume disposable bags as this is the easiest most stress-free solution. However, there are those who would also receive the same happiness from using 'bags for life' knowing they are helping the environment, so the indifference curve slopes slightly upwards at each end of the consumption bundles to include small amounts of the reusable bags. This therefore satisfies the assumption that this is an abnormal case. As a result of these factors, the indifference

curve touches the average amount of bags consumed (per individual per year) at 144 (ReUselt, 2014). This is inconsistent with the concept of normal indifference curves, as a main property is that they must slope downward. The assumption of 'more is better' that a utility-maximising individual would make is not valid in this case, as after the 144 point there is no extra utility gained from consuming one more from an effectively valueless good. Therefore, as a result the indifference curve does not slope downward and is tangential to the X-axis. To summarise the marginal Utility (i.e the additional utility gained from consumption of one more good or service) is zero. It is also worth noting that we are assuming that reusable and disposable bags are exact substitutes.

However, now that the government has implemented this minimum pricing we can assume that disposable bags now have a monetary value, creating a new budget constraint resulting in a new indifference curve. This new indifference curve will have a different Utility value to the previous curve, as it now has a physical monetary cost attached onto it.



As a result of the new minimum price, people requiring a bag will switch to the more durable reusable carrier bags instead of purchasing a £0.05 one-use bag each time they require one; in general they see this to be the most cost effective alternative. Yet this would mean that the indifference curve would lie on the Y-axis, but realistically not everyone will constantly carry around reusable bags and in general many people will still consume some level of disposable bags.

We can use the information gathered from the Welsh data to give a rough estimate on how many one-use carrier bags will be purchased in Scotland. The data stated that the new price has decreased the consumption of carrier bags by on average 79% (Gov.uk, 2014). By using this, we can calculate that after the new legislation that $(100\% - 79\%) \times 144 = 30$, so even

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with the saving we can say that on average people will still consume 30 one-use bags per year. We can therefore work out how many reusable carrier bags will also be used, by using the same budget constraint/ income formula if consumption of one-use bags stayed the same.

$m = \text{budget level}$ $P_X = \text{price of reusable bag}$ $Q_X = \text{quantity of reusable bag}$

$P_Y = \text{price of one – use bag}$ $Q_Y = \text{quantity of one – use bag}$

$$m = P_X Q_X + P_Y Q_Y$$

It is then possible to gauge the amount one would have to spend in order to continue using the same amount of disposable bags and no ‘bags for life’.

$$m = P_X Q_X + 0.05 * 144$$

$$m = £7.20$$

Combining this budget constraint with the previously calculated amount of 30 one-use bags, per year per person, after the minimum price allows us to create a new optimum bundle for someone who was previously using 144 one-use bags (purely for convenience we will assume that the reusable bags are around £1.)

$$m = P_X Q_X + P_Y Q_Y$$

$$7.20 = 1.00 * Q_X + 0.05 * 30$$

$$Q_X = 5.7$$

$$(\approx 6)$$

This optimum bundle for a consumer will be 30 disposable carrier bags and around 6 bags for life; this is the best bundle that the average consumer may choose for the given income level. This new level of utility will be as close to the previous level of utility that is possible for the average individual assuming all other things remain constant.

To summarise: given Wales and Ireland's data, we can certainly assume that the overall demand for plastic bags is price elastic and the quantity demanded will decrease dramatically with a small change in price. As shown, this will create a new indifference curve including a mix of disposable bags and reusable bags to show that (if the consumer still wishes to carry the same amount of goods, and assuming also that the decrease in one-use bags will be 79%) the consumption bundle will be 30 disposable bags and 6 reusable bags per year. The overall impact on the consumer will be negative as it is now impossible to receive the same amount of utility for the same cost. Now, as a result of the new minimum price and budget constraint, they must purchase the bags and this leads onto an opportunity cost of the bags.

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