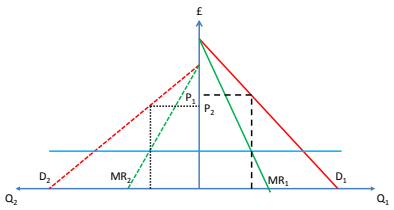
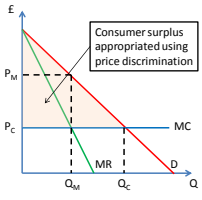
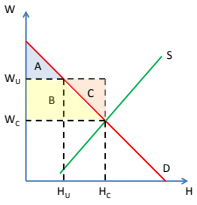
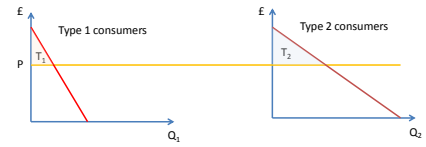
Reading map:

The basic discussion about price discrimination is in Chapter 9 of the Carlton and Perloff text book. While I have used only Figures 9.1 and 9.2 and Example 9.3 in class, it would be useful to read pages 291-300 as well. And, of course, you are not be required to know the mathematics discussed in the chapter. The discussion about strategic/non-linear pricing is in Chapter 10. I have used material from most of the chapter, the notable exception being pages 331-335.

Simple price discrimination – opportunity  	This diagram highlights the fact that it is, in principle, possible for a seller to charge two customers two different prices, if their price elasticities of demand for the product are different. (Price elasticity of demand is related to the slope of the demand curve, the inverse of the slope being the change in quantity demanded given a change in price.) In the diagram, there are two customers, one with a steep demand curve D_1 and another with a flat demand curve D_2. The blue horizontal line is the MC curve of the seller. As you can see, the profit maximising condition of MC = MR will lead to a price of P_1 for the customer with the steeper demand curve, and P_2 for the customer with the flatter demand curve. Of course, the seller has to be able to prevent resale of the product by the latter customer to the former. But if that is possible, then price discrimination will be feasible.
Simple price discrimination – gains  • Competition: (P_C , Q_C) • Monopoly: (P_M , Q_M) • Discriminating monopolist: – D is the MR curve – MC = MR at Q_C – Appropriates the consumer surplus generated in a competitive market	This diagram explains the incentive for price discrimination, wherever feasible. Irrespective of whether a market is perfectly or imperfectly competitive, there is always consumer surplus. This is because if a single price is charged for a product then there are always consumers who are willing to pay more than the price. Indeed, the last customer to get served is the one whose willingness to pay is just equal to the price. Hence, it is always lucrative for the seller to charge a different price for each customer, if possible, setting the price for a customer close (or equal) to his/her willingness to pay.
Simple price discrimination – example  • Market: (W_C , H_C) • If labourers are not unionised, firm's surplus is (A + B) • Labourers are unionised • Either fully price discriminate, charging W_C for the last hour of labour supplied • Or set wage at W_U and simultaneously set H_C as the minimum number of hours	If labourers are not unionised then there is a perfectly competitive labour market, and A+B is the consumer surplus for the firms. If labourers get unionised, the union becomes a monopoly supplier of labour. It can extract the consumer surplus from the firms in two ways. It can fully price discriminate, or it can negotiate both a wage rate W_U <u>and</u> the minimum number of hours of labour H_C that firms will have to buy. The latter choice would give the unionised labourers B+C more than what they would have got in a perfectly competitive labour market. If A = C, they will extract the entire consumer surplus of the firms.

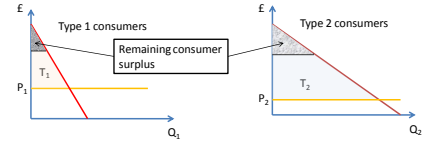
Two-part tariff – basics



- A fixed charge for one product and a marginal charge for another
- If the firm reduces price, it can charge a higher lump sum fee
- If it cannot distinguish between the two types of customers, it will not be able to charge more than T_1 as lump sum fee
- Strategy would have two components: (1) the trade off between price and lump sum fee, and (2) whether or not to focus on Type 2 consumers only

A two part tariff is a pricing strategy whereby a firm charges a lump sum amount for access to the product, and a marginal fee for the consumption of the product thereafter. For example, night clubs can charge a flat entry fee and thereafter fee per drink. Similarly, amusement parks can charge a flat entrance fee and a fee for each ride thereafter. The basic idea is to come up with a combination of the lump sum charge and the marginal fee that would extract a significant part of the consumer surplus from the customers.

Two-part tariff – strategy



- The firm offers two combinations (T_1, P_1) and (T_2, P_2): $T_1 < T_2$ and $P_1 > P_2$
- Type 1 consumers choose (T_1, P_1) because the lump sum fee is low and they do not lose all their consumer surplus
- Type 2 consumers choose (T_2, P_2) because the low price generates a lot of consumer surplus, not all of which is lost to the lump sum fee
- The consumers self select themselves, revealing their type to the firm

Read the section entitled "A Single Two Part Tariff", pages 314-316.

Tie-in sales – monopolised products

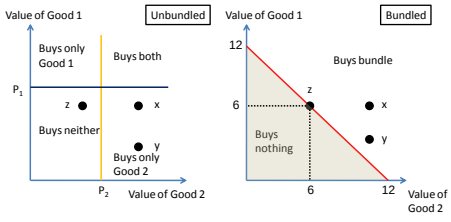
	Type 1 consumers	Type 2 consumers
Amount willing to pay for Good A	£ 9,000	£ 10,000
Amount willing to pay for Good B	£ 3,000	£ 2,000
Amount willing to pay for Goods A and B	£ 12,000	£ 12,000
Revenue from separate sales = (9,000 x 2) + (2,000 x 2) = £22,000		
Revenue from tied-in sales = (12,000 x 2) = £24,000		

	Type 1 consumers	Type 2 consumers
Amount willing to pay for Good A	£ 9,000	£ 10,000
Amount willing to pay for Good B	£ 500	£ 2,000
Amount willing to pay for Goods A and B	£ 9,500	£ 12,000
Revenue from separate sales = (9,000 x 2) + (500 x 2) = £19,000		
Revenue from tied-in sales = (9,500 x 2) = £19,000		

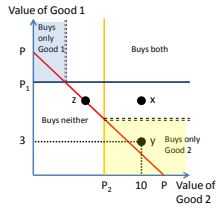
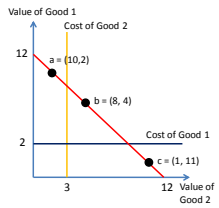
Lesson: Tie-in sales work when the willingness to pay for different goods is inversely correlated for different consumer types.

The basic idea here is that tie-in sales can be used to increase revenue if different types of customers have very different willingness to pay for the products that are bundled together. In the slide to the left, consider the upper panel. Type 1 customers are willing to pay more for Good B (3000 > 2000), while Type 2 customers are willing to pay more for Good A (10,000 > 9000). If a firm sells the products separately, and wants to sell them to both these customers, then it would have to charge lower of the two prices for each product: £9000 for Good A and £2000 for Good B. If it bundles the products, however, it would be able to charge each customer £12,000. In the lower panel, Type 2 customers are willing to pay more for both Good A and Good B. In that case, there is no difference in the revenue generated by tie-in sales and the revenue generated by selling the products separately.

Tie-in sales – mixed bundling – I



There are two goods (1 and 2), and three customers. The values that the customers assign to the goods are plotted along the two axes. P_1 and P_2 are the prices of the two goods. Suppose that *x*, *y*, and *z* gives us the combination of valuation of Good 1 and Good 2 of the three customers. Customer *z* values Good 1 less than P_1 and Good 2 less than P_2. So she buys neither good. Customers *y* and *z* value Good 2 more than P_2 but value Good 1 less than P_1. So, each of them buy only Good 2. Suppose now the seller bundles the two goods, and sets a price that is equal to the sum of the valuation of these goods by Customer *z*. Let Customer *z*'s valuation for each good be 6, such that the price for the bundle is set at 12 (= 6 + 6). In that case, the red line passing through *z* separates

	customers whose total valuation for the two goods is higher than 12 from those whose total valuation is less than 12. Any customer who is above or to the right of this red line (such as *x* and *y*) have total valuation higher than 12, while those below or to the left of the red line have total valuation less than 12. Thus, bundling enables the seller to sell both the goods to all the customers.
Tie-in sales – mixed bundling – II  • Prices: $P_1 = 8$, $P_2 = 8$, $P = 12$ Consumers: • At *y* (3, 10): CS of Good 2 = 10 – 8 = 2 CS of bundle = 13 – 12 = 1 Buy only Good 2 • At *x* (6, 10): CS of Good 2 = 10 – 8 = 2 CS of bundle = 16 – 12 = 4 Buys fixed price bundle Mixed bundling	As we saw in the previous slide, simple bundling would split the space into two, those above or to the red line would buy the bundle (of the two goods), while those below or to the left of the red line will not. A strategy called mixed bundling, whereby each goods can be sold separately or the two goods sold as a bundle, will increase the number of customers to whom at least one of the goods can be sold. In the slide to the left, consumers maximise their consumer surplus (CS). In that case, as the numbers indicate, Customer *y* will buy only Good 2, instead of buying the bundle of both the goods. In the case of simple bundling, she would have bought only the bundle. More importantly, there are now people below the red line who value Good 1 more than P_1 and Good 2 more than P_2. These people will buy these goods individually, even though they would not have purchased the bundle.
Tie-in sales – mixed bundling – III  • Three types of consumers: a, b, c • Cost: Good 1 = 2, Good 2 = 3 • Pricing separately: $P_1 = 8$, Profit = (8 – 2) x 2 = 12 $P_2 = 11$, Profit = (11 – 3) = 8 Total profit = 20 • Bundling: P = 12, Profit = (12 – 5) x 3 = 21 • Mixed bundling: $P_1 = 9.99$, $P_2 = 10.99$, P = 12 *a* buys only Good 1, *b* buys bundle, *c* buys only Good 2 Profit = 7.99 (from *a*) + 7 (from *b*) + 7.99 (from *c*) = 22.98 Mixed bundling	The previous slide demonstrates that mixed bundling will benefit the customers. What incentive, however, do firms or sellers have to use this pricing strategy? The numerical example in the slide to the left demonstrates that mixed bundling generates higher profits than either simple bundling or selling the goods separately.