$v(q) > u(q)$

What if there is **asymmetric information**: only the owner knows the quality q?

Publicly available information:

Quality q	best: A	B	C	D	E	worst: F	
Number of cars	120	200	100	240	320	140	Total: 1,120
Proportion	$\frac{120}{1120}$	$\frac{200}{1120}$	$\frac{100}{1120}$	$\frac{240}{1120}$	$\frac{320}{1120}$	$\frac{140}{1120}$	
$v(q)$ (seller)	720	630	540	450	360	270	
$u(q)$ (buyer)	800	700	600	500	400	300	

Buyer: if a car is offered to me at price p should I buy it?

Buying a car at price p is playing the lottery

$$\begin{pmatrix} \$(800-p) & \$(700-p) & \$(600-p) & \$(500-p) & \$(400-p) & \$(300-p) \\ \frac{120}{1120}=\frac{3}{28} & \frac{200}{1120}=\frac{5}{28} & \frac{100}{1120}=\frac{5}{56} & \frac{240}{1120}=\frac{3}{14} & \frac{320}{1120}=\frac{2}{7} & \frac{140}{1120}=\frac{1}{8} \end{pmatrix}$$

Suppose $p = 460$

Quality q	best: A	B	C	D	E	worst: F
$v(q)$ (seller)	720	630	540	450	360	270

Back to previous example. Suppose that p = 460. Then only qualities D, E, F offered

Step 1: convert probabilities to a common denominator:

Quality q	best: A	B	C	D	E	worst: F
Proportion	$p_A = \frac{3}{28}$	$p_B = \frac{5}{28}$	$p_C = \frac{5}{56}$	$p_D = \frac{3}{14}$	$p_E = \frac{2}{7}$	$p_F = \frac{1}{8}$

Step 2: condition on {D, E, F}

Quality q	best: A	B	C	D	E	worst: F
Proportion						

Suppose $p = 380$

Quality q	best: A	B	C	D	E	worst: F
$v(q)$ (seller)	720	630	540	450	360	270

Quality	L	M	H
probability	$\frac{1}{6}$	$\frac{2}{3}$	$\frac{1}{6}$
seller's value	900	$1,200$	$1,400$
buyer's value	$1,020$	$1,320$	$1,500$

For every price p determine if there is a second-hand market.

All-you-can eat buffet in Davis. Hire a market research firm to find out about demand. Customers of different types. A type of a customer is a pair (r, c) where

- r is the maximum price the customer is willing to pay
- c is the number of dishes that the customer would consume

Customer type	(\$8, 2)	(\$8, 2.5)	(\$8.50, 2.5)	(\$8.50, 3)	(\$9, 3)	(\$9, 3.5)
Proportion	$\frac{1}{4}$	$\frac{1}{8}$	$\frac{1}{6}$	$\frac{1}{24}$	$\frac{1}{8}$	$\frac{7}{24}$

Risk neutral. **Cost per dish is \$2.40**.

- If you charge \$8 then average consumption

Average cost per customer

Profit per customer

What if you charge $8.50?

Customer type	(\$8, 2)	(\$8, 2.5)	(\$8.50, 2.5)	(\$8.50, 3)	(\$9, 3)	(\$9, 3.5)
Proportion	$\frac{1}{4}$	$\frac{1}{8}$	$\frac{1}{6}$	$\frac{1}{24}$	$\frac{1}{8}$	$\frac{7}{24}$

Step 1: convert to same denominator

Customer type	(\$8, 2)	(\$8, 2.5)	(\$8.50, 2.5)	(\$8.50, 3)	(\$9, 3)	(\$9, 3.5)
Proportion						

- If you charge $8.50 then

Customer type	(\$8.50, 2.5)	(\$8.50, 3)	(\$9, 3)	(\$9, 3.5)
Proportion				

Average consumption:

Average cost per customer

Profit per customer

- If you charge $9 then

Customer type	(\$9, 3)	(\$9, 3.5)
Proportion		

Average consumption:

Average cost per customer

Profit per customer