Answer to 6.11)

$p^* = p + \phi y \qquad y = m - p$

lots of "real rigidity" means ϕ is small

$K(p_i - p^*)^2$ Loss (second-degree approximation)

See: if $p_i = p^*$, no loss

Adjust price from p_i if $K(p_i - p^*)^2 > Z$ ← (menu cost)

Initially $m = 0$ & all prices at optimal level

$p = p + \phi(m-p) = p - \phi p = (1-\phi)p$

so $p = p_i = 0$ so $K(p_i - p^*)^2 = K(-p^*)^2 = Kp^{*2}$

Then $m = m'$

f Fraction of firms that adjust prices.

"Fixed-price equilibrium" means

for $f = 0$, $K(p_i - p^*)^2 < Z$

This is only equilibrium if

for $f > 0$, $K(p_i - p^*)^2 < Z$

What if

for $f = 1$, $K(p_i - p^*)^2 > Z$? Multiple equilibria!

ANSWER TO 6.10) (cont.)

a) Find p, y & p^* in terms of m' & f

$p = f p^* + (1-f)\cdot 0 = f p^*$

(price charged by non-adjusters

$p^* = p + \phi(m - p)$

$= f p^* + \phi(m' - f p^*)$

$\Rightarrow p^* - f p^* + \phi f p^* = \phi m'$

$\Rightarrow p^* = \dfrac{\phi}{1-(1-\phi)f} m'$

$p = f p^* = \dfrac{\phi f}{1-(1-\phi)f} m'$

$y = m - p = \left(1 - \dfrac{\phi f}{1-(1-\phi)f}\right) m'$

$= \dfrac{1-(1-\phi)f - \phi f}{1-(1-\phi)f} m' = \dfrac{(1-f)}{1-(1-\phi)f} m'$

6.10 (cont'd.)

b) Plot Kp^{*2} as fn of F

$$Kp^{*2} = K\left[\frac{\phi m'}{1-(1-\phi)F}\right]^2 \quad \text{call this } Q(F)$$

F runs between 0 & 1.

So figure out $Q(0)$, $Q(1)$, & what fn looks like between 0 & 1. We know shape if we know $Q_F(.)$, $Q_{FF}(\ )$.

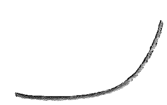
For $Q(0) = K\phi^2 m'^2$

$$Q(1) = K m'^2$$

$$Q_F = 2K\frac{(1-\phi)(\phi m')^2}{[1-(1-\phi)F]^3} = 2K\frac{(1-\phi)(\phi m')^2}{[1+(\phi+1)F]^3}$$

$$Q_{FF} = 6K\frac{(1-\phi)^2(\phi m')^2}{[1-(1-\phi)F]^4} > 0$$

Consider two cases: $\phi < 1$, $\phi > 1$.

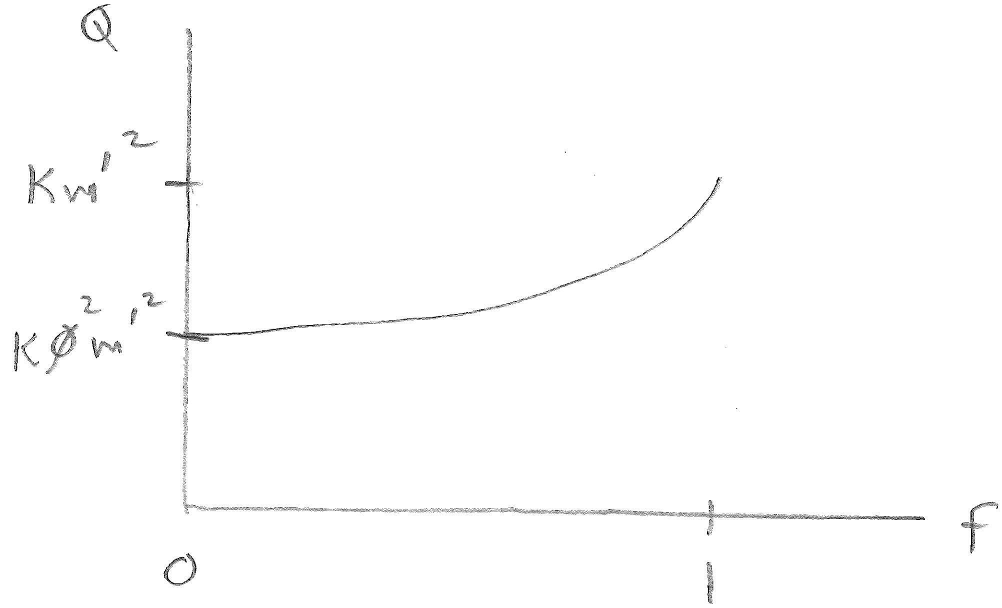
For $\phi < 1$, $Q_F > 0$, $Q_{FF} > 0$ so looks like 

For $\phi > 1$, $Q_F < 0$, $Q_{FF} > 0$ so 

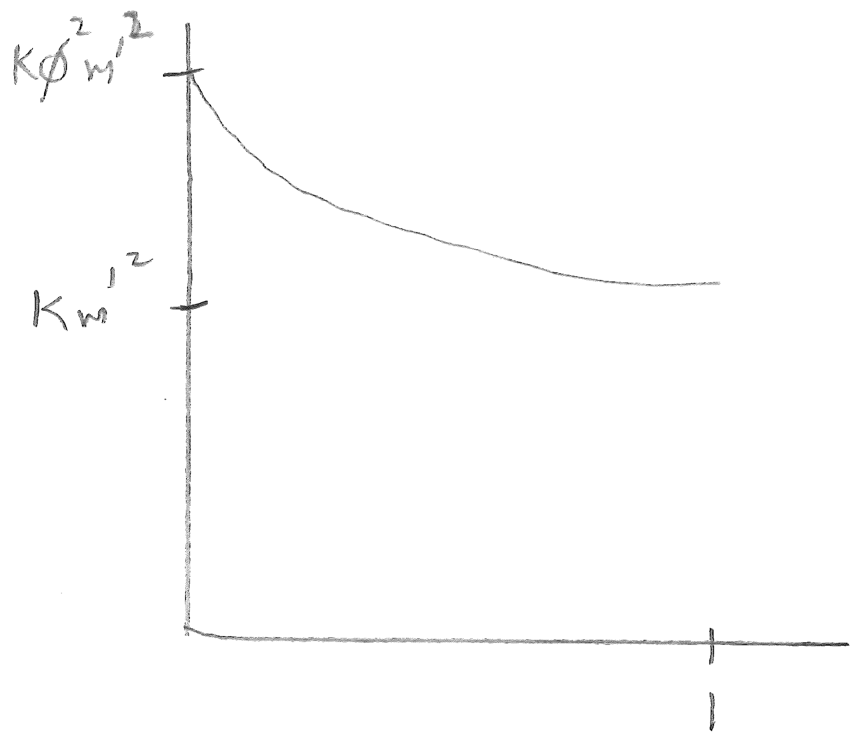
C, 10)

b) plot Q(f) (cont.)

For $\phi < 1$



For $\phi > 1$



6.10)

c) Multiple equilibria? No equilibrium?

Multiple equilibria means

— if others adjust, I'll adjust

— if others don't adjust, I won't adjust

No equilibrium means

— if others adjust, I won't adjust

— if others don't adjust, I will.

Hence multiple equilibria means:

— for $f = 1$, $Q > Z$

— for $f = 0$, $Q < Z$

$$Q(0) < Z < Q(1)$$

This can only be true if $Q_f > 0$ so it can only be true if $\phi < 1$.

(lots of real rigidity)

No equilibrium means

— for $f = 1$, $Q < Z$

— for $f = 0$, $Q > Z$

(no real rigidity)

$$Q(1) < Z < Q(0)$$

can be true if $Q_f < 0$ so can only be true if $Q > 1$