ANSWER TO 6.17

$$p^f = p^* = (1-\phi)p + \phi m$$

$$p^r = Ep^* = (1-\phi)Ep + \phi Em$$

$$p = qp^r + (1-q)p^f \quad \text{where } 0<q<1$$

$(m - Em)$ Error in expectation; surprise in AD

a) What's p^f given p^r, m.

$$p^f = (1-\phi)\left(qp^r + (1-q)p^f\right) + \phi m$$

Solve for p^f. Gives:

$$p^f = \frac{(1-\phi)qp^r + \phi m}{1-(1-\phi)(1-q)}$$

Note $1-(1-\phi)(1-q) = \phi + (1-\phi)q$

so $$p^f = \frac{(1-\phi)qp^r + \phi m}{\phi + (1-\phi)q}$$

Look! Denominator is almost the same as coefficient on p^r in numerator.

Add to top $\phi p^r - \phi p^r$

$$p^f = \frac{(1-\phi)qp^r + \phi m + \phi p^r - \phi p^r}{\phi + (1-\phi)q} = p^r + \frac{\phi}{\phi + (1-\phi)q}(m - p^r)$$

ANSWER TO 6.16 (cont.)

b) What's p^r given Em?

$$p^r = (1-\phi)Ep + \phi Em = (1-\phi)E\left[qp^r + (1-q)p^f\right] + \phi Em$$

$$= (1-\phi)E\left[qp^r + (1-q)p^r + (1-q)\frac{\phi}{\phi+(1-\phi)q}(m-p^r)\right] + \phi Em$$

Use $Ep^r = p^r$ and solve for p^r:

$$p^r = (1-\phi)\left(p^r + (1-q)\frac{\phi}{\phi+(1-\phi)q}Em - (1-q)\frac{\phi}{\phi+(1-\phi)q}p^r\right) + \phi Em$$

$$\left(\underbrace{1-(1-\phi)}_{\phi} + \frac{(1-q)\phi}{\phi+(1-\phi)q}\right)p^r = \left(\phi + \frac{(1-q)\phi}{\phi+(1-\phi)q}\right)Em$$

$$p^r = Em$$

c) Does ΔEm affect y? Does $\Delta(m-Em)$ affect y?

Find p and y as determined by m and Em

$$p = qp^r + (1-q)p^f = qp^r + (1-q)\left(p^r + \frac{\phi}{\phi+(1-\phi)q}(m-p^r)\right)$$

and $p^r = Em$ gives

$$p = qEm + (1-q)Em + \frac{(1-q)\phi}{\phi+(1-\phi)q}(m-Em)$$

$$= Em + \frac{(1-q)\phi}{\phi+(1-\phi)q}(m-Em)$$

6.16 (cont.)

c) (cont.)

$$y = m - p \quad \text{sd}$$

$$y = m - Em - \frac{(1-q)\phi}{\phi + (1-\phi)q}(m - Em)$$

$$= \frac{\phi + (1-\phi)q - (1-q)\phi}{\phi + (1-\phi)q}(m - Em)$$

$$= \frac{q}{\phi + (1-\phi)q}(m - Em)$$

See: ΔEm does not affect y

$\Delta(m - Em)$ does affect y.

Note: Small ϕ makes $\frac{\partial y}{\partial(m - Em)}$ bigger

Small ϕ means more "real rigidity":

$$p_i^* - p = \phi y$$

small ϕ means output has little effect on desired relative price

"Real rigidity"