1

1) $Q_D = f(P, Y)$ $\quad f_P = \frac{\partial Q_D}{\partial P} < 0 \quad f_Y > 0$

2) $Q_S = g(P)$ $\quad g_P > 0$

3) $Q_D = Q_S$

1') $$dQ_D = \frac{\partial Q_D}{\partial P} \cdot dP + \frac{\partial Q_D}{\partial Y} \cdot dY$$

$$\frac{dQ_D}{Q_D} = \frac{\partial Q_D}{\partial P} \cdot \frac{P}{Q_D} \cdot \frac{dP}{P} + \frac{\partial Q_D}{\partial Y} \cdot \frac{Y}{Q_D} \cdot \frac{dY}{Y}$$

$$\dot{Q}_D = \varepsilon_{Q_D,P} \dot{P} + \varepsilon_{Q_D Y} \dot{Y}$$

2') $$\dot{Q}_S = \varepsilon_{Q_S,P} \dot{P}$$

3') $$\dot{Q}_D = \dot{Q}_S$$

1'') $$\dot{Q}_D/\dot{Y} = \varepsilon_{Q_D,P} \dot{P}/\dot{Y} + \varepsilon_{Q_D Y}$$

2'') $$\dot{Q}_S/\dot{Y} = \varepsilon_{Q_S,P} \dot{P}/\dot{Y}$$

3'') $$\dot{Q}_D/\dot{Y} = Q_S/\dot{Y}.$$

$$\begin{bmatrix} 1 & 0 & -\varepsilon_{Q_D P} \\ 0 & 1 & -\varepsilon_{Q_S P} \\ 1 & -1 & 0 \end{bmatrix} \begin{bmatrix} \dot{Q}_D/\dot{Y} \\ \dot{Q}_S/\dot{Y} \\ \dot{P}/\dot{Y} \end{bmatrix} = \begin{bmatrix} \varepsilon_{Q_D Y} \\ 0 \\ 0 \end{bmatrix}$$

$$A \qquad x = B$$

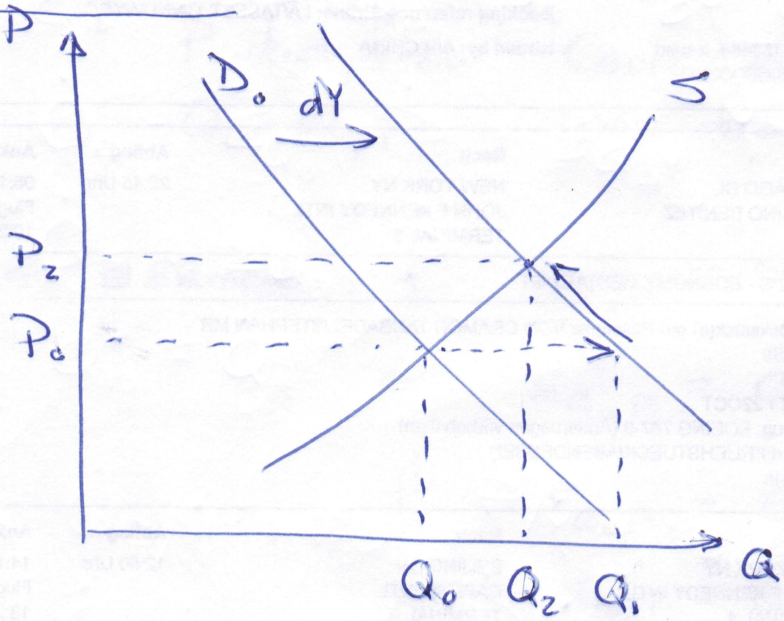
Look at first equation $\dfrac{\dot{Q}_D}{\dot{Y}} = \varepsilon_{Q_DP}\dfrac{\dot{P}}{\dot{Y}} + \varepsilon_{Q_DY}$

?

One is partial $\varepsilon_{Q_DY} = \dfrac{\partial Q_D}{\partial Y}\dfrac{Y}{Q_D}$ similar, but not the same

the other total $\dfrac{\dot{Q}_D}{\dot{Y}} = \dfrac{dQ_D}{dY}\dfrac{Y}{Q_D}$

Graphical solution



movement from $Q_0 \to Q_1$ is partial, ε_{Q_DY} but not sustainable, not an equilibrium

$Q_0 \to Q_2$ is the total $\dfrac{\dot{Q}_D}{\dot{Y}}$ that accounts for all adjustments in the system that lead to new equilibrium.

mathematical Solution:

$$\frac{\dot{Q}_D}{\dot{Y}} = \frac{\begin{vmatrix} \varepsilon_{Q_DY} & 0 & -\varepsilon_{Q_DP} \\ 0 & 1 & -\varepsilon_{Q_SP} \\ 0 & -1 & 0 \end{vmatrix}}{\begin{vmatrix} 1 & 0 & -\varepsilon_{Q_DP} \\ 0 & 1 & -\varepsilon_{Q_SP} \\ 1 & -1 & 0 \end{vmatrix}} = \frac{-\varepsilon_{Q_DY}\,\varepsilon_{Q_SP}}{-\varepsilon_{Q_SP} + \varepsilon_{Q_DP}}$$

$$\frac{\dot{Q}_D}{\dot{Y}} = \varepsilon_{Q_D Y} \cdot \left(\frac{\varepsilon_{Q_S P}}{\varepsilon_{Q_S P} - \varepsilon_{Q_D P}} \right)$$

$$= \underbrace{\varepsilon_{Q_D Y}}_{\text{Partial, from } Q_0 \to Q_1} \cdot \underbrace{\left(\frac{1}{1 - \frac{\varepsilon_{Q_D P}}{\varepsilon_{Q_S P}}} \right)}_{\text{"Correction", the move from } Q_1 \to Q_2}$$

For example, if $\varepsilon_{Q_S P} = \infty$ ... or $\varepsilon_{Q_D P} = 0$ ... $\Big\}\ \frac{\dot{Q}_D}{\dot{Y}} = \varepsilon_{Q_D Y}$

if $\varepsilon_{Q_S P} = 0$ ... or $\varepsilon_{Q_D P} = \infty$ ... $\Big\}\ \frac{\dot{Q}_D}{\dot{Y}} = 0$