

1.

$$a) \quad \frac{dIM}{d\varepsilon} \frac{\varepsilon}{IM} = qY \frac{\varepsilon}{IM} = \frac{\varepsilon qY}{IM} = 1$$

$$b) \quad \frac{dX}{d\varepsilon} \frac{\varepsilon}{X} = x(-\sigma)\varepsilon^{-\sigma-1}Y^* \frac{\varepsilon}{X} = -\sigma \frac{x\varepsilon^{-\sigma}Y^*}{X} = -\sigma$$

$$Y = a + bY - bT + c - di + G + x\varepsilon^{-\sigma} - qY$$

$$c) \quad Y - bY + qY = a - bT + c - di + G + x\varepsilon^{-\sigma}$$

$$Y = \frac{1}{1-b+q} [a - bT + c - di + G + x\varepsilon^{-\sigma}Y^*]$$

$$\Delta Y = \frac{1}{1-b+q} \Delta G$$

A high marginal propensity to consume (b) increases the multiplier effect and a high marginal propensity to import (q) decreases the multiplier effect since some demand “leaks” abroad. With $b=0.6$ and $q=0.4$ the multiplier is $1/0.8=1.25$.

$$d) \quad \Delta IM = \varepsilon q \Delta Y = \frac{\varepsilon q}{1-b+q} \Delta G = \frac{0.4}{1-0.6+0.4} \Delta G = 0.5 \Delta G.$$

Some of the increase in demand is directed towards imports.

$$e) \quad \text{Using the result in c) we get} \quad \frac{dY}{d\varepsilon} = \frac{1}{1-b+q} x(-\sigma)\varepsilon^{-\sigma-1}Y^*$$

$$\frac{dY}{d\varepsilon} \frac{\varepsilon}{Y} = -\frac{1}{1-b+q} \sigma \frac{x\varepsilon^{-\sigma}Y^*}{Y} = -\frac{1}{1-b+q} \sigma \frac{X}{Y} = -\frac{1}{1-0.6+0.4} \cdot 2 \cdot 0.4 = -1$$

The effect of the real exchange rate depends on how large exports are relative to GDP, the price elasticity of exports, and the size of the multiplier.

f) See calculation above. A real appreciation of one percent leads to a one percent decrease in production.