HANDOUT ON OPEN ECONOMY GOODS MARKET

Define two objects:

Domestic aggregate demand (this is demand by domestic agents for domestic goods)
DD = C + I + G

Aggregate demand (this is demand by all agents for domestic goods)
ZZ = DD + NX = C + I + G + X - εM

Recall our behavioral assumptions

1. δC/δY > 0
2. δM/δY > 0
3. δX/δε > 0
4. δM/δε < 0
5. δX/δY > 0
6. ZZ = Y

Very important notes:

1. DD = ZZ only when NX = 0 which implies that net exports are zero at the level of income where the DD and ZZ curves cross
2. δDD/δY = δC/δY > δZZ/Y = δDD/δY + δNX/δY = δC/δY - εδM/δY
   This inequality is true because ε > 0 and assumption 2 above, and implies that the slope of the ZZ curve is flatter than the slope of the ZZ curve. The flatter slope also implies that the multiplier is smaller in the open economy than the closed economy
3. When Y = 0, ZZ > DD because when Y = 0 we still have X > 0. This implies the intercept of the ZZ curve denoted by ZZ₀ is larger than the intercept of the DD curve denoted by DD₀. Note the following:
   DD₀ = C₀ + I + G
   ZZ₀ = DD₀ + NX₀ = DD₀ + X - εM₀
   where if C = c₀ + c₁*(Y-T) we have C₀ = c₀ - c₁*T
   ZZ₀ = DD₀ + NX₀ = DD₀ + X - εM₀
   where M₀ is imports when domestic income is zero

Proof that increase in Y* ALWAYS improves the trade balance in this model:

Note that ε, P, and P' are assumed to be fixed. First figure out the effect on aggregate demand.
Assume consumption, exports, and imports are linear in income, so δC/δY = c₁, δX/δY' = x₁, and δM/δY = m₁.

The old equilibrium income Y = ZZ₀/(1-c₁+εm₁). Since equilibrium output linear in autonomous spending ZZ₀ we can write

ΔY = ΔZZ₀/(1-c₁+εm₁)

Note further that the change in foreign income does not affect domestic aggregate demand so we have ΔDD = 0, but more importantly,

ΔZZ₀ = ΔDD₀+ΔNX₀ = ΔX·εΔM₀ = x₁ΔY' > 0

So the ZZ curve shifts up by x₁·ΔY' and equilibrium income increases by ΔY = x₁ΔY'/(1-c₁+εm₁) > 0.

Since net exports are linear in income, we can write ΔM = m₁ΔY and thus

ΔNX = ΔX-εΔM = x₁ΔY'-εm₁ΔY = x₁ΔY'[1-εm₁/(1-c₁+εm₁)] = x₁ΔY'(1-c₁)/(1-c₁+εm₁) > 0

Note ΔNX can be decomposed into two effects ΔX = ΔNX₀ and εΔM. The exports component is the impact effect of higher foreign output and thus demand for exports, and the second term corresponds to the increase in imports that the increase in exports creates due to rising equilibrium income.
Effects of a Real Depreciation and the Marshall Lerner Condition:

For simplicity, assume $M = m_1 Y / \varepsilon$ and $X = x_1 Y^* \varepsilon$ which are consistent with our behavioral assumptions above, and the Marshall-Lerner condition, the latter of which is shown below.

The impact effect of a real depreciation on autonomous net exports is

$\Delta N_{X_{0}} = \Delta X - \Delta (\varepsilon M) = x_1 Y^* > 0$ so $\Delta ZZ_{0} = x_1 Y^*$

This implies (note the new multiplier due to different functional form for imports)

$\Delta Y = x_1 Y^* / (1 - c_1 + m_1)$

As net exports are linear in equilibrium income and the real exchange rate

$\Delta N_{X} = \Delta X - \Delta (\varepsilon M) = x_1 Y^* - m_1 \Delta Y = x_1 Y^* (1 - c_1) / (1 - c_1 + m_1) > 0$