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)
$ZZ = DD + NX = C + I + G + X - \varepsilon M$

Recall our behavioral assumptions

1. $\delta C/\delta Y > 0$
2. $\delta M/\delta Y > 0$
3. $\delta X/\delta\varepsilon > 0$
4. $\delta M/\delta\varepsilon < 0$
5. $\delta X/\delta Y^* > 0$
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. $\delta DD/\delta Y = \delta C/\delta Y > \delta ZZ/Y = \delta DD/\delta Y + \delta NX/\delta Y = \delta C/\delta Y - \varepsilon\delta M/\delta Y$
   This inequality is true because $\varepsilon > 0$ 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 ZZ_0 is larger than the intercept of the DD curve denoted by DD_0. Note the following:

   $DD_0 = C_0 + I + G$ where if $C = c_0 + c_1*(Y-T)$ we have $C_0 = c_0 - c_1*T$
   $ZZ_0 = DD_0 + NX_0 = DD_0 + X - \varepsilon M_0$ where M_0 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 $\delta C/\delta Y = c_1$, $\delta X/\delta Y^* = x_1$, and $\delta M/\delta Y = m_1$.

The old equilibrium income $Y = ZZ_0/(1-c_1+\varepsilon m_1)$. Since equilibrium output linear in autonomous spending ZZ_0 we can write

$\Delta Y = \Delta ZZ_0/(1-c_1+\varepsilon m_1)$

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

$\Delta ZZ_0 = \Delta DD_0+\Delta NX_0 = \Delta X-\varepsilon*\Delta M_0 = x_1\Delta Y^* > 0$

So the ZZ curve shifts up by $x_1*\Delta Y^*$ and equilibrium income increases by $\Delta Y = x_1\Delta Y^*/(1-c_1+\varepsilon m_1) > 0$.

Since net exports are linear in income, we can write $\Delta M = m_1\Delta Y$ and thus

$\Delta NX = \Delta X-\varepsilon\Delta M = x_1\Delta Y^*-\varepsilon*m_1\Delta Y = x_1\Delta Y^*[1-\varepsilon m_1/(1-c_1+\varepsilon m_1)] = x_1\Delta Y^*(1-c_1)/(1-c_1+\varepsilon m_1) > 0$

Note ΔNX can be decomposed into two effects $\Delta X = \Delta NX_0$ and $\varepsilon\Delta M$. 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 Conditoin:

For simplicity, assume $M = m_1Y/\varepsilon$ and $X = x_1Y^*\varepsilon$ 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
$\Delta NX_0 = \Delta X-\Delta(\varepsilon M) = x_1Y^* > 0$ so $\Delta ZZ_0 = x_1Y^*$
This implies (note the new multiplier due to different functional form for imports)
$\Delta Y = x_1Y^*/(1-c_1+m_1)$
As net exports are linear in equilibrium income and the real exchange rate
$\Delta NX = \Delta X-\Delta(\varepsilon M) = x_1Y^*-m_1\Delta Y = x_1Y^*(1-c_1)/(1-c_1+m_1) > 0$