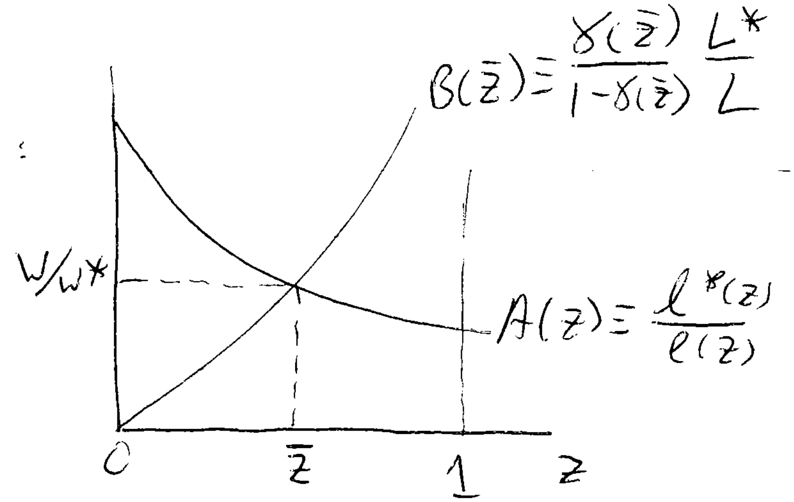
Sketch of Answers to Final Exam Fall 2002/03

Part I

1.] The Model:



(A) When workers are not able to move across countries, so that L^* and L are exogenously determined, we could have $\frac{W}{W^*} \gtreqless 1$ in equilibrium. However, if for an initial allocation of workers across countries we had $\frac{W}{W^*} > 1$ and therefore $W > W^*$, then when workers are permitted to move across countries they will leave the foreign country and come to the domestic country, leading to a fall in L^* and an increase in L. In terms of the figure above, this would shift $B(\bar{z})$ to the right, leading to a fall in $\frac{W}{W^*}$ until either $\frac{W}{W^*} = 1$ is reached or all workers have moved to the domestic country.

If $\frac{w}{w^*} = 1$ is reached, then we have that

$$\frac{\ell^*(\bar{z})}{\ell(\bar{z})} = 1 = \frac{w}{w^*}, \text{ and so } \ell^*(\bar{z}) = \ell(\bar{z}).$$

But then for each $z \in [0, \bar{z}]$,
we have
$$\frac{\ell^*(z)}{\ell(z)} > 1, \text{ and so } \ell(z) < \ell^*(z),$$

which means that the domestic country has the lowest unit labor requirement for each good it produces.

And for each $z \in [\bar{z}, 1]$,
we have
$$\frac{\ell^*(z)}{\ell(z)} < 1, \text{ and so } \ell^*(z) < \ell(z),$$

which means that the foreign country has the lowest unit labor requirement for each good it produces.

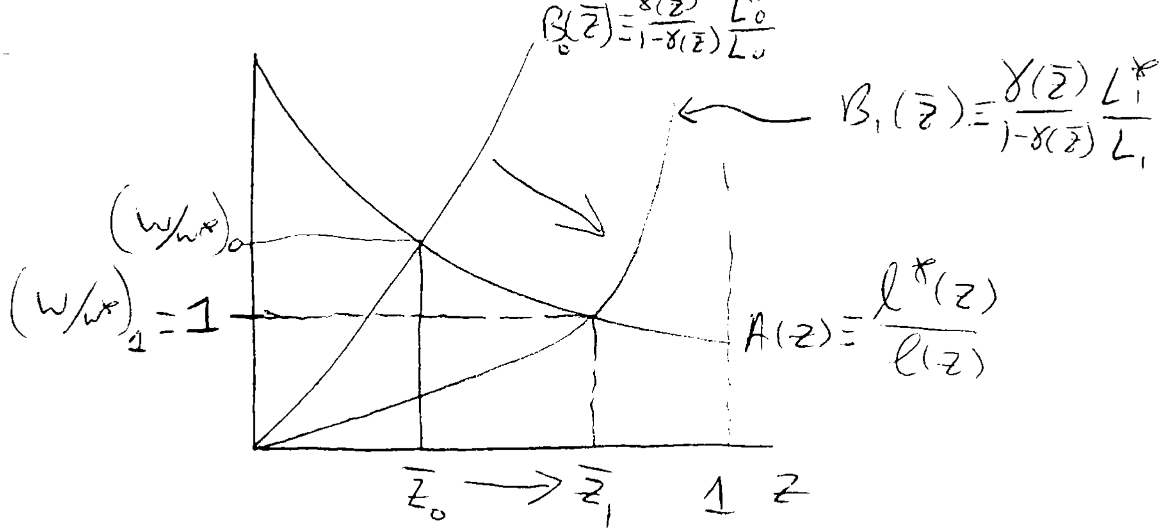
If instead $\frac{w}{w^*} > 1$ even when all workers have moved to the domestic country, then this implies that
$$\frac{\ell^*(1)}{\ell(1)} > 1, \text{ and so } \ell(1) < \ell^*(1).$$

But then for each $z \in [0, 1]$,

we have $\frac{l^*(z)}{l(z)} > 1$, also $l(z) < l^*(z)$,

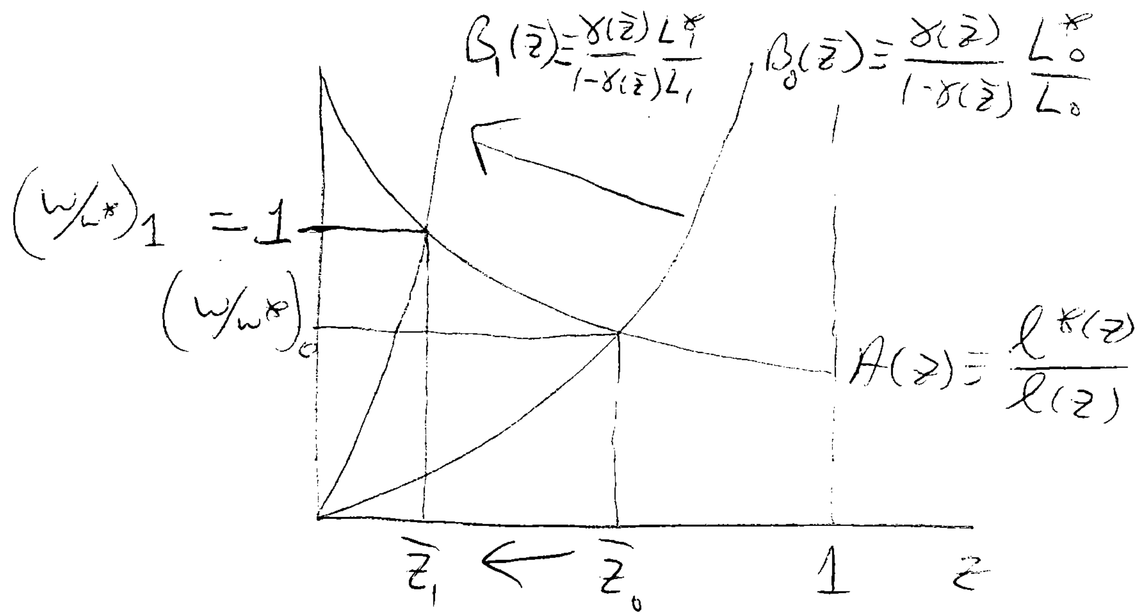
which means that the domestic country has the lowest unit labor requirement for each good it produces (and it produces every good).

So, we have now shown that, if for an initial allocation of workers across countries we had $\frac{w}{w^*} > 1$, then when workers are permitted to move across countries they will move from foreign to domestic and in equilibrium each good will be produced in the country that has the most efficient technology for that good. The figure looks like this (for the case where we reach $\frac{w}{w^*} = 1$):



(4)

The arguement is exactly analogous if we start from an initial allocation of workers across countries for which $\frac{W}{W^*} < 1$, except that workers would then migrate from the domestic county to the foreign country. The figure looks like this (for the case where we reach $\frac{w}{w^*} = 1$):



(B) If the home county makes a transfer of income to the foreign country, the $A(z)$ curve is unaffected. But we need to restate the $B(\bar{z})$ curve. To make the transfer, the home country runs a trade [redacted] surplus equal to the amount transferred. So instead of [redacted]

$$WL[1-\gamma(\bar{z})] = w^* L^* \gamma(\bar{z}),$$

we now have

$$(w^*L^*+T)\,\gamma(\bar{z}) - (wL-T)[1-\gamma(\bar{z})] = T,$$

where T is the transfer from home to foreign. The term (w^*L^*+T) is foreign income inclusive of the transfer, and this is multiplied by the fraction of income spent on domestically produced goods ($\gamma(\bar{z})$) to get home-country exports. The term $(wL-T)$ is home income inclusive of the transfer, and this is multiplied by the fraction of income spent on foreign produced goods $(1-\gamma(\bar{z}))$ to get home-country imports. The difference between the value of exports -- $(w^*L^*+T)\gamma(\bar{z})$ -- and imports -- $(wL-T)[1-\gamma(\bar{z})]$ -- is the home transfer to foreign -- T.

But simplifying this expression, and solving for $\frac{w}{w^*}$, yields

$$\frac{w}{w^*} = \frac{\gamma(\bar{z})}{1-\gamma(\bar{z})}\frac{L^*}{L},$$ and so the

$B(\bar{z})$ curve does not shift with the introduction of a transfer $(T>0)$.

Since neither the $A(z)$ nor the $B(\bar{z})$ curves shift when home transfers income

6

to foreign, the equilibrium range of products produced in the home country is unchanged.

This means that there is no "secondary" effect (burden or blessing) of the transfer, since w/w^* does not change and so no prices change with the transfer. To see this, note that, for the domestic country, the price of an import good relative to the price of an export good is

$$\frac{p^*(z_{import})}{p(z_{export})} = \frac{w^* \ell^*(z_{import})}{w \ell(z_{export})}$$

which remains unchanged with an income transfer from home to foreign since $\frac{w}{w^*}$ does not change.

By the transfer criterion, this must reflect the fact that foreign spends the extra income exactly as home would have spent it. The assumption of the model that assures this is that both countries share the same Cobb-Douglas preferences, characterized by the budget shares $b(z)$ for $z \in [0,1]$.

2.] We are to consider an unexpected permanent and equal-percentage increase in the U.S. and foreign money supply on the exchange rate in the short and long run.

First, the long run exchange rate is unaffected, since it is given by

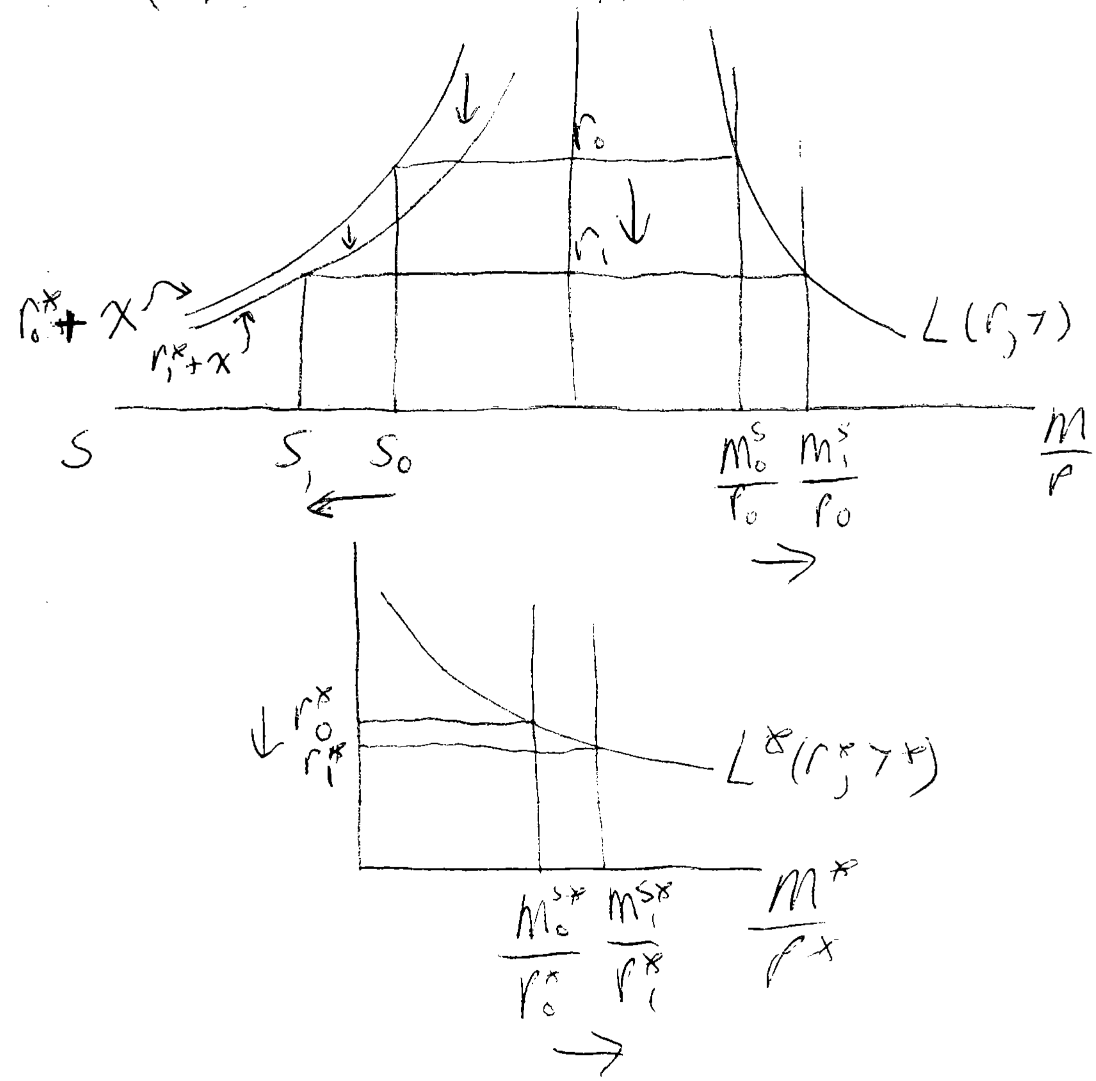
$$S = \frac{P}{P^*} = \frac{M^s / L(r, Y)}{M^{s*} / L^*(r^*, Y^*)} .$$

Therefore, $E_t(S_{t+1})$ is unaffected.

With P and P^* fixed in the short run, the increase in U.S. money supply will lead to a drop in r in the short run, while the increase in foreign money supply will lead to a drop in r^* in the short run.

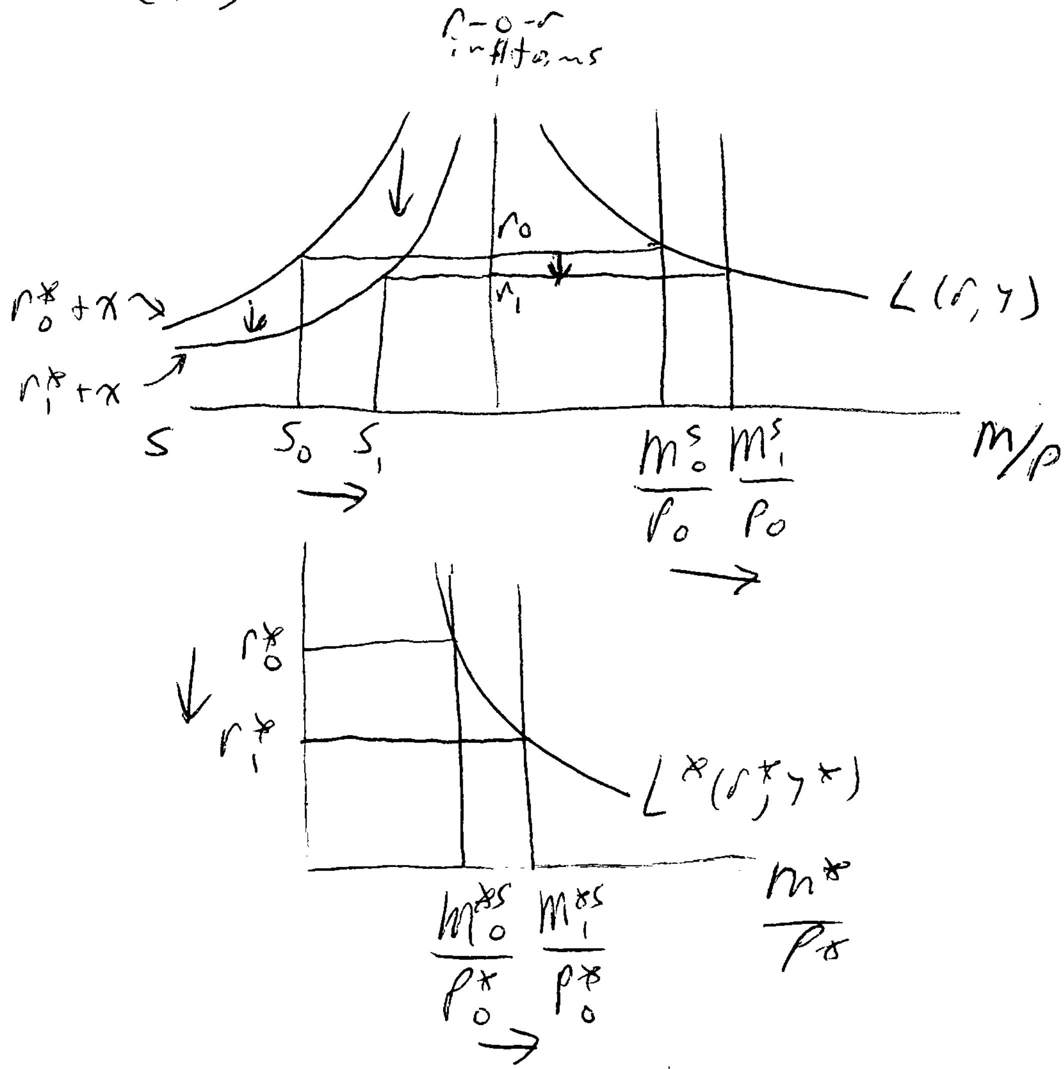
Therefore, whether S rises, falls, or stays the same in the short run will depend on whether r falls by more, the same, or less than r^* in the short run. So we have 3 cases:

(i)



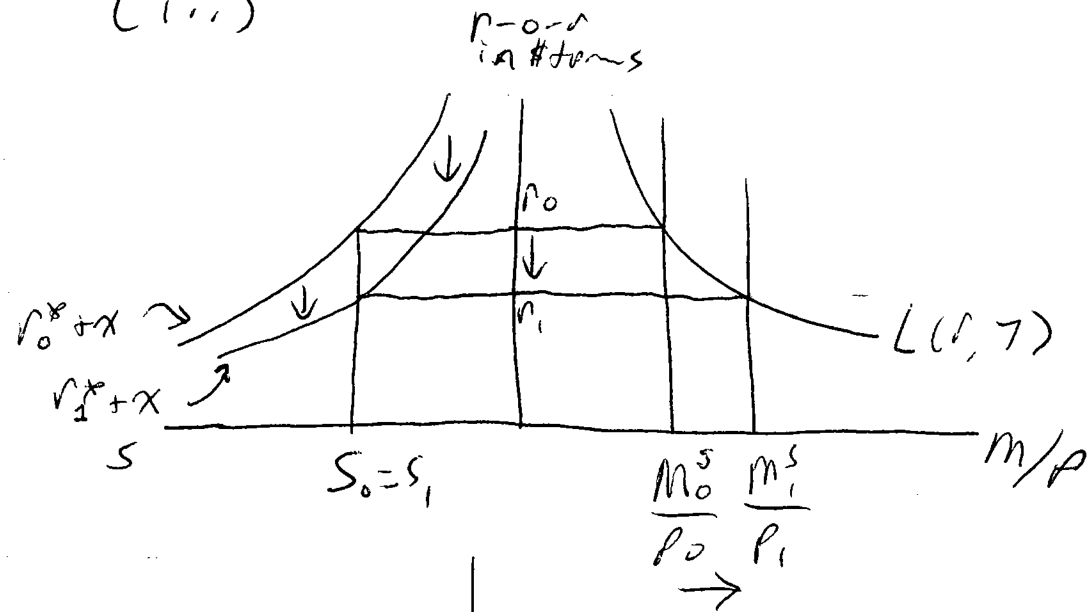
In case (i), S rises in the short run, because r falls by more than r^* in the short run. This case occurs if the domestic demand for real money balances is relatively insensitive to changes in r as compared to the sensitivity of foreign demand for real money balances with regard to r^*, i.e., $L(r, y)$ is steep and $L^*(r^*, y^*)$ is flat.

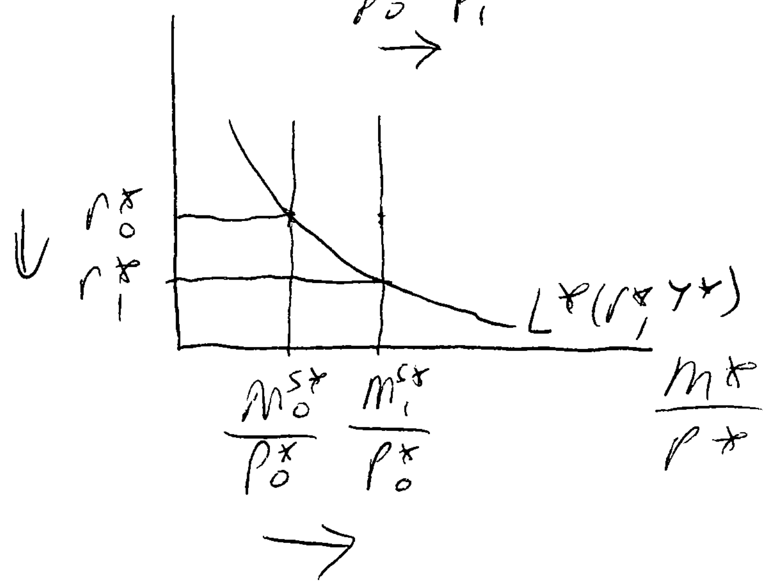
(ii)



In case (ii), S falls in the short run, because r falls by less than r^* in the short run. This case occurs if the domestic demand for real money balances is relatively sensitive to changes in r as compared to the sensitivity of foreign demand for real money balances with regard to r^*, i.e., $L(r, Y)$ is flat and $L^*(r^*, Y^*)$ is steep.

(iii)



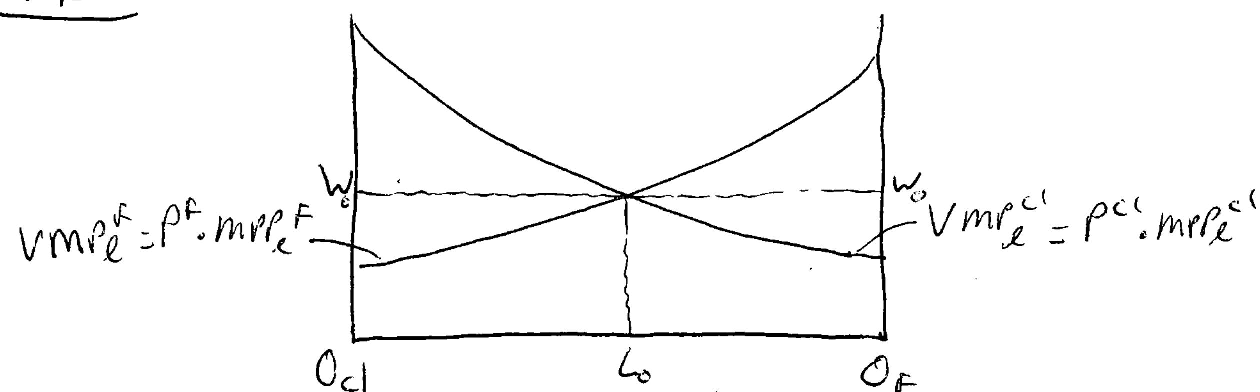


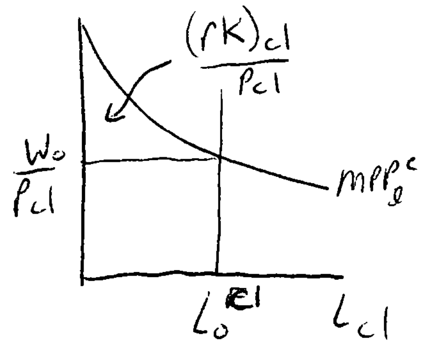
In case (iii), S is unchanged in the short run, because r falls by the same amount as r^*, which occurs when $L(r, Y)$ and $L^*(r^*, Y^*)$ have the same elasticity in the relevant range.

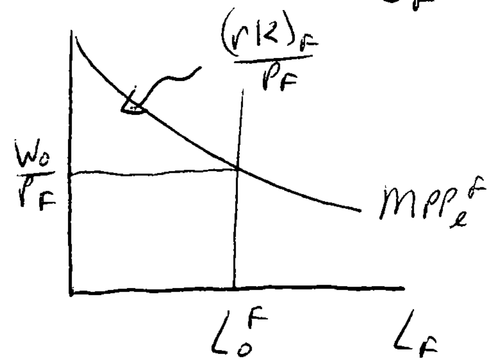
Part II

The Models:

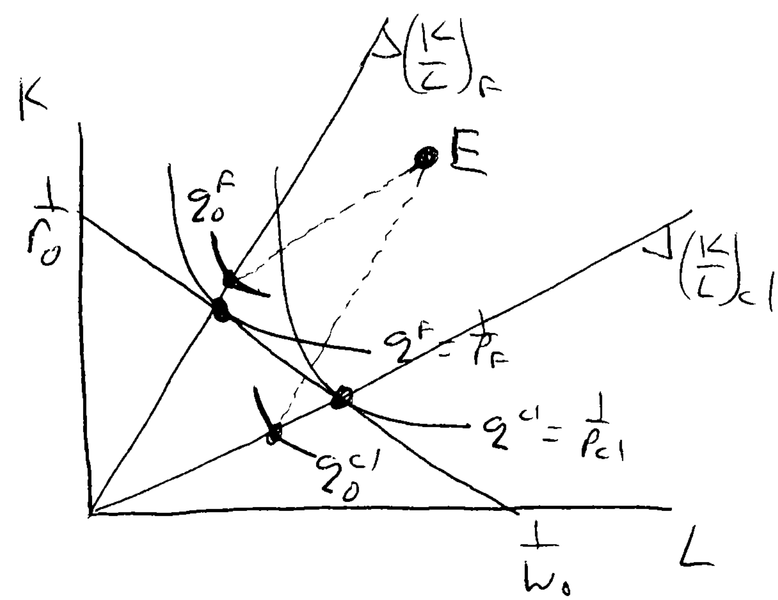
Short Run







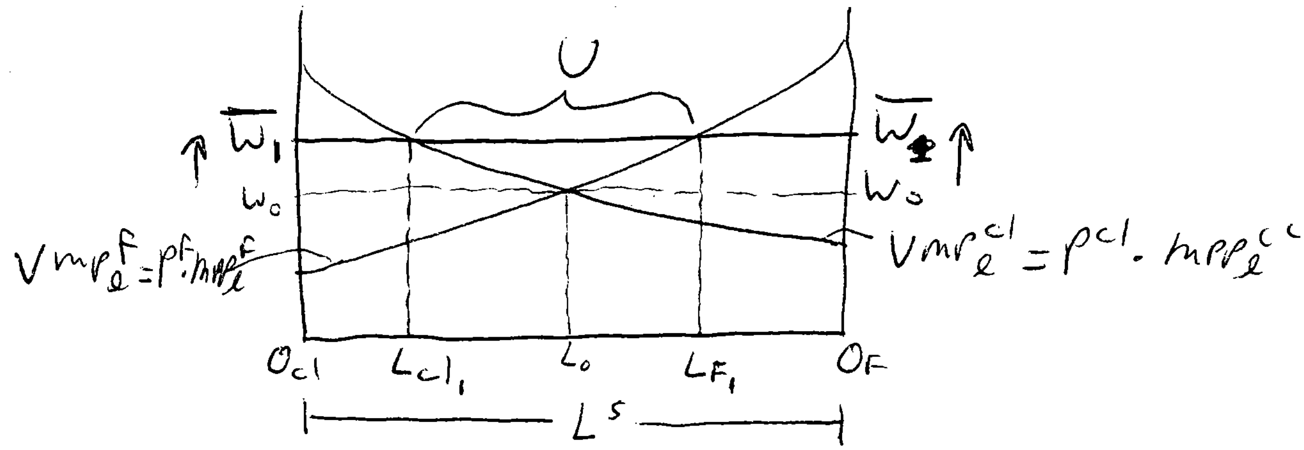
Long Run

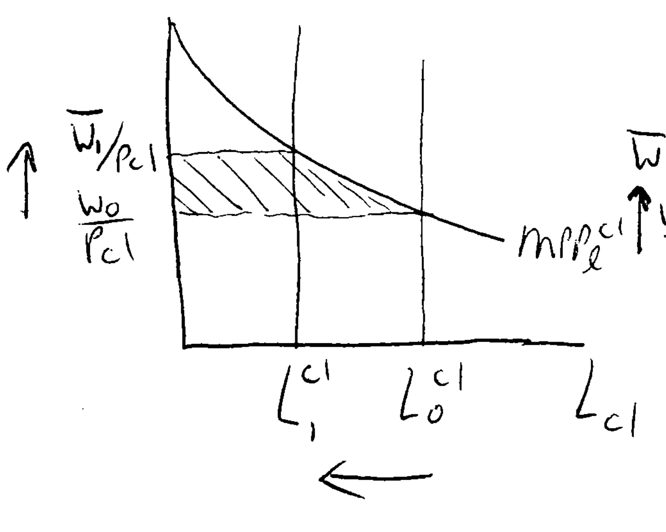


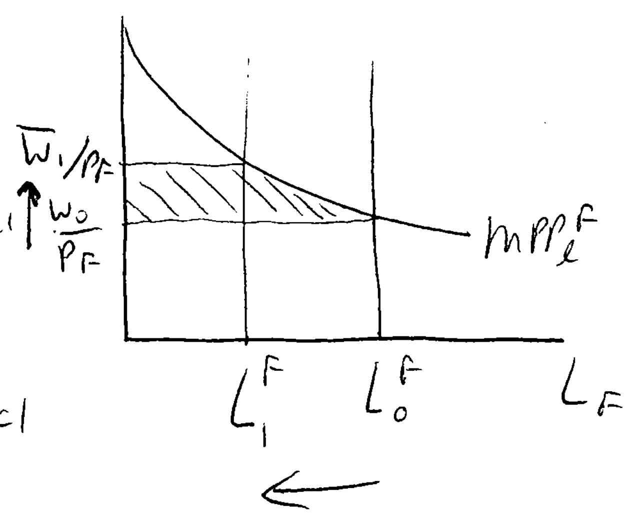
12

We are to consider the impact of a minimum wage $\overline{W}_1 > W_0$.

(A) In the shortrun, the figures become:





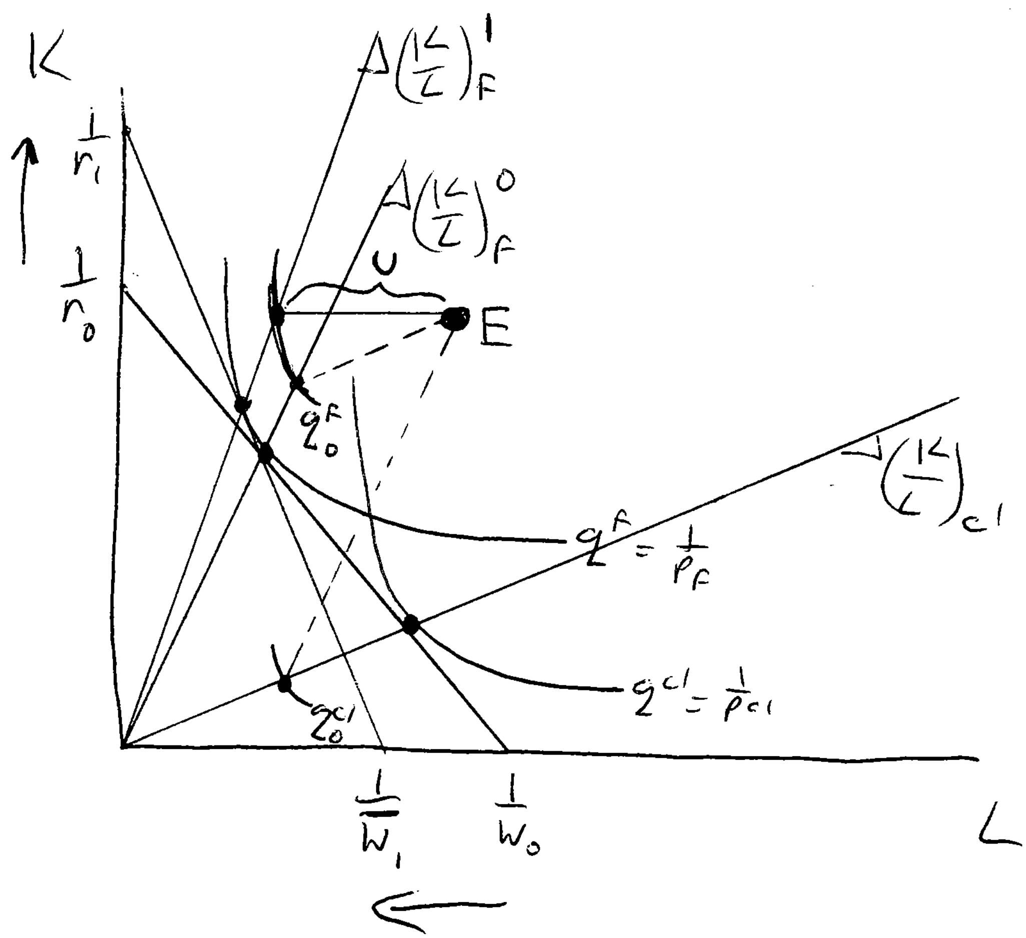


As these figures illustrate, the imposition of $\overline{W}_1 > W_0$:
(i) causes unemployment, labeled by U in the top graph;
(ii) causes production of both food & clothing to fall, since both L^{cl} and F^F fall as depicted in the bottom two graphs. and

(iii) will lead to higher real wages for employed workers (as shown by the rising $\frac{W}{P_{cl}}$ and $\frac{W}{P_F}$ in the bottom two graphs)

and lower real incomes for all capitalists in the economy, with the loss in capitalist income depicted by the shaded region in the bottom left graph for capitalists in clothing (measured in units of clothing) and in the bottom right graph for capitalists in food (measured in units of food).

(B) In the Long Run, the figure becomes:



As this figure illustrates, the imposition of $\overline{w}_1 > w_0$:

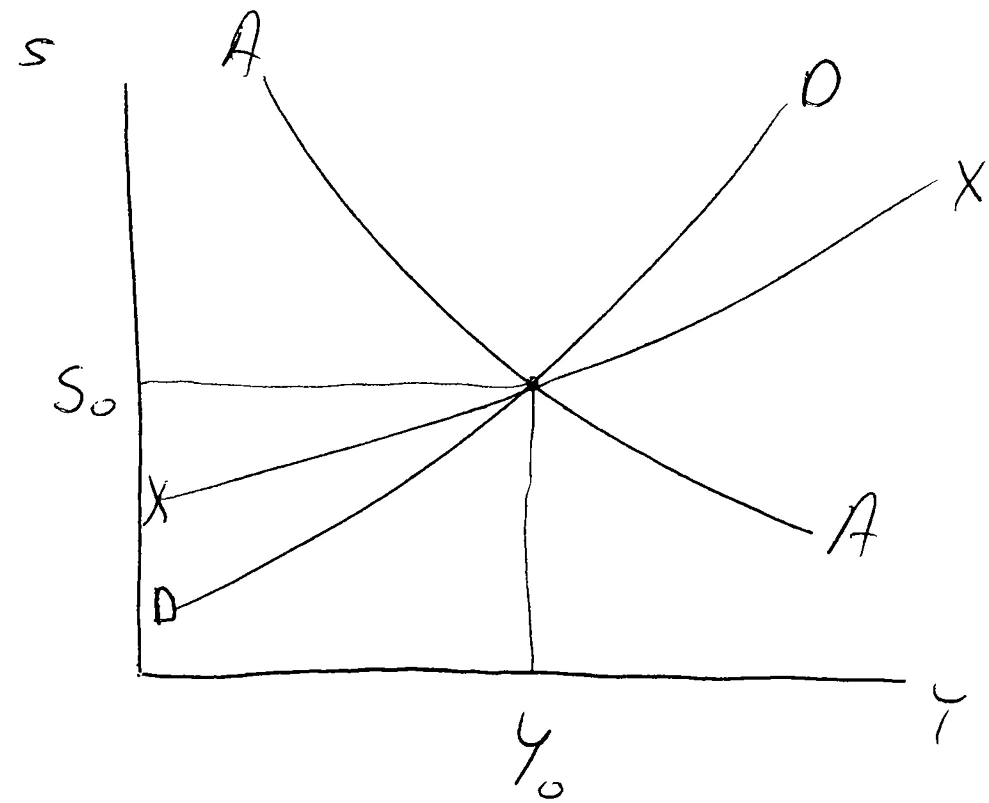
(i) causes unemployment, labeled by U in the figure;

(ii) causes production of clothing to cease completely, as the unit value isoquant for clothing now lies above the unit iso-cost line in this economy, and could cause the production of food to either increase, diminish, or (as pictured) stay the same; and

(iii) increases the real wage of employed workers (as $\overline{w}_1 > w_0$ and P_{cl} & P_F don't change) and decreases the real return earned by capitalists (as $r_1 < r_0$ and P_{cl} & P_F don't change).

Part III

The Model:



16

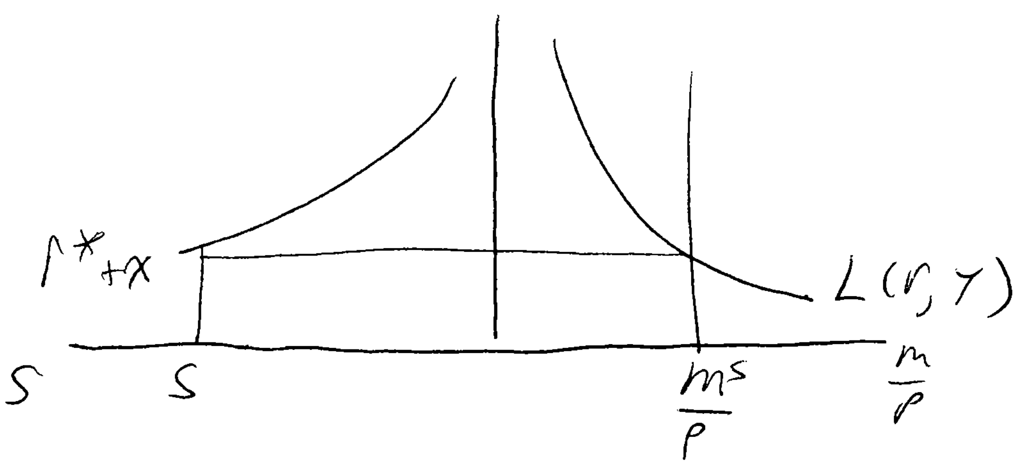
(A) The domestic government should increase G to increase the domestic output level y in the short run.

The DD curve comes from

$$Y = D\left(\overset{+}{\frac{SP^*}{P}}, \overset{+}{Y-T}, \overset{+}{I}, \overset{+}{G}\right)$$

so an ↑ in G shifts DD to the right.

The AA curve comes from.



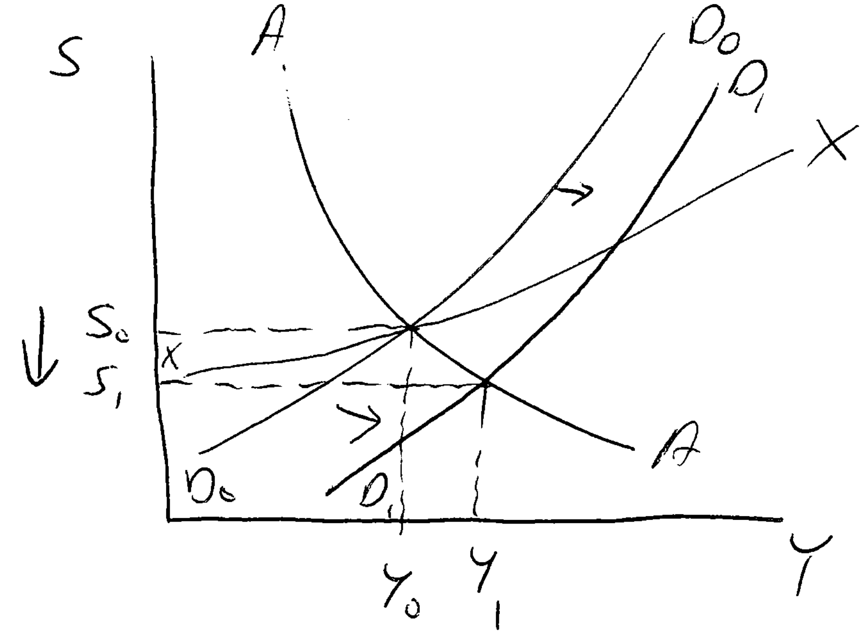
so an ↑ in G does not shift AA.

The XX curve comes from

$$CA = CA\left(\overset{+}{\frac{SP^*}{P}}, \overset{-}{Y-D}\right)$$

so an ↑ in G does not shift XX.

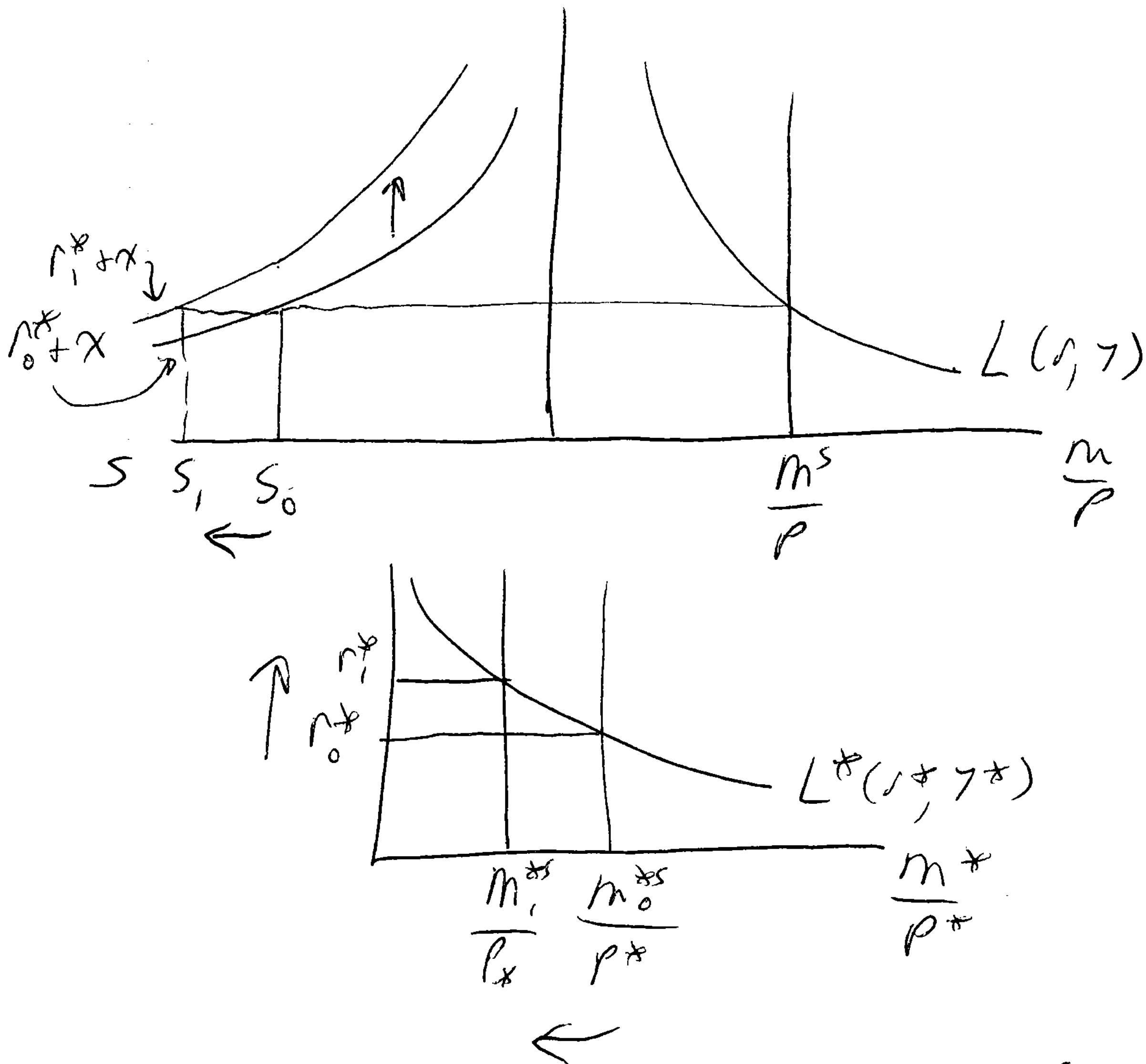
Hence the temporary ↑ in G is illustrated below:



So: (i) G should be increased;
(ii) This will cause S to fall; and
(iii) This will cause the domestic current account balance (CA) to worsen.

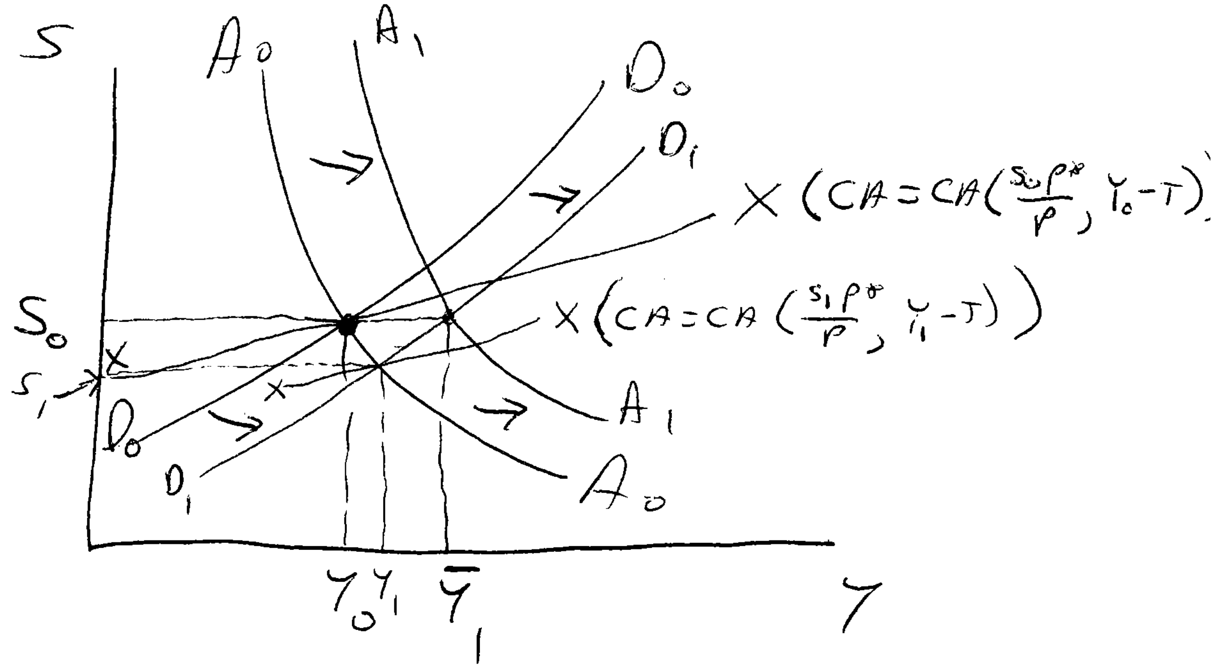
(B) If the foreign government wishes to use a temporary change in M^{s*} to counteract the impact of the ↑ in G on S, it needs to change M^{s*} in a direction that will increase S (from S_1 back to S_0), so that S does not move when G is increased and M^{s*} is changed temporarily. This means that M^{s*} must be decreased.

By (temporarily) decreasing M^{s*}, we have:



And so a temporary decrease in M^{s*} will shift AA up (or out).

This means that the decrease in M^{s*} can be chosen to keep S from changing when G increases, as depicted next:



SO:

(i) The government should increase M^{s*};

(ii) The foreign government's policy response (the increase in M^{s*}) will help the domestic government in its effort to achieve a short run increase in y (that is, $\bar{Y}_1 > Y_1$); and

(iii) The foreign government's policy response (the increase in M^{s*}) will contribute to an improvement in the domestic current account balance (CA) relative to what it would have been with the increase in G alone (because the XX curve is flatter than the DD curve).

Note: The XX curve does not shift: we are just depicting the XX curve evaluated at (S_0, Y_0) and at (S_1, Y_1).