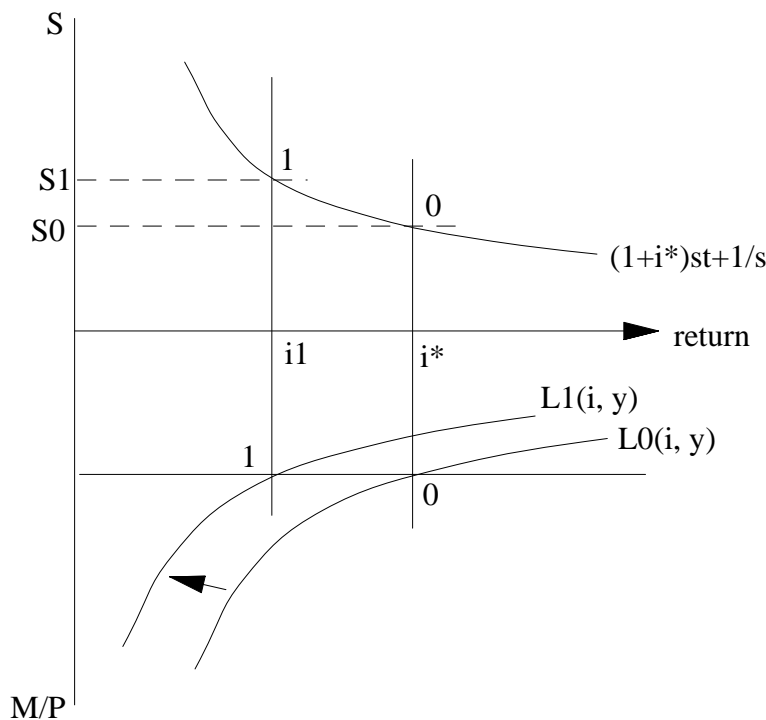


hw 3 solution

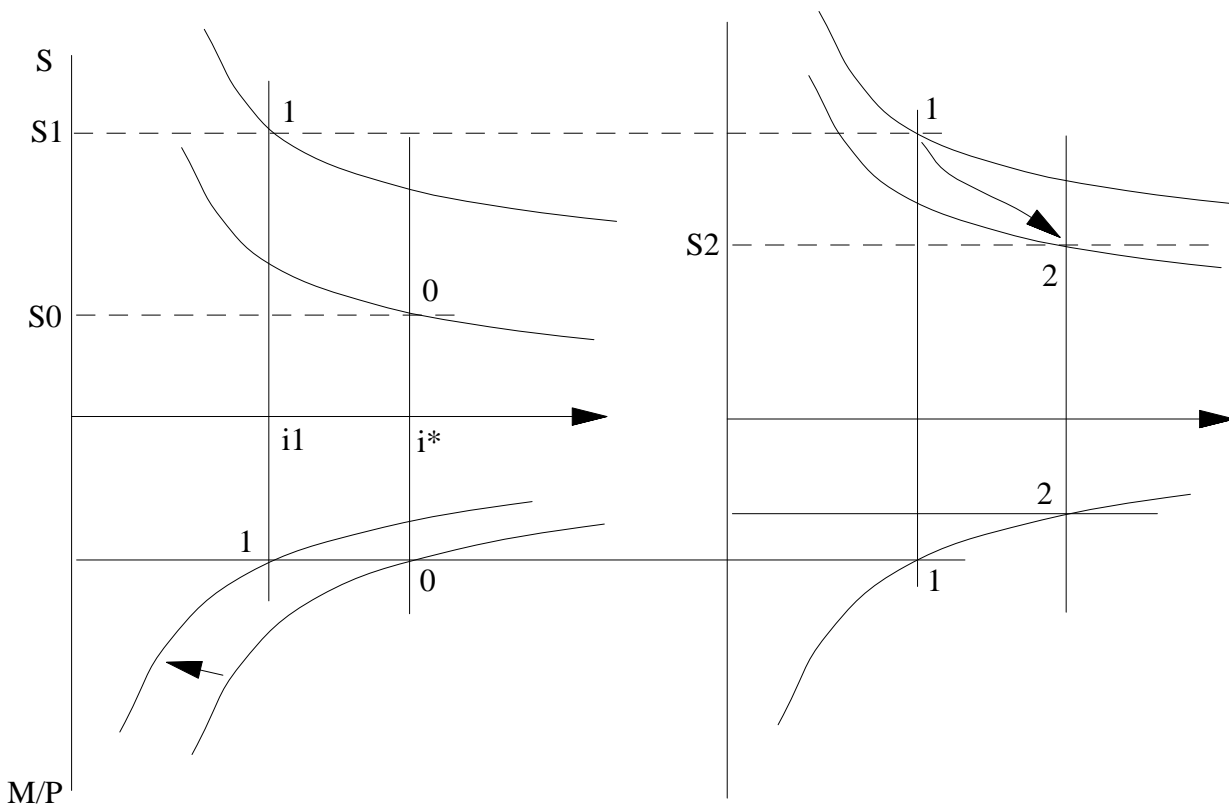
2. Let's start with the interest parity condition as given in class, $(1+i) = (1+i^*)S_{t+1}/S_t$. This can be rewritten as $i = (S_{t+1}-S_t)/S_t + i^*S_{t+1}/S_t$ where we have domestic interest income on the LHS and the first term on the RHS stands for capital gains and the second for interest income abroad both of which make up the return on foreign investment.
- a) The tax rate is t and the taxpayer keeps $(1-t)$. In this part we tax all three terms above so the interest parity equation becomes $(1-t)i = (1-t)(S_{t+1}-S_t)/S_t + (1-t)i^*S_{t+1}/S_t$. Obviously the equation still holds since we multiplied both sides by $(1-t)$ but our model also comprises the money market. There taxing interest income lowers the opportunity cost of holding money leading to an outward shift of the money demand curve. Along the lines of our answer to the permanent money demand shift in problem 1 - only with opposite signs - we get an appreciation of the exchange rate.
- b) Here we don't tax the capital gains so the equation becomes $(1-t)i = (S_{t+1}-S_t)/S_t + (1-t)i^*S_{t+1}/S_t$. Since in a long run equilibrium the exchange rate is constant and there are no capital gains this difference does not alter the new long run equilibrium obtained in a) which still involves an appreciation because the opportunity cost of holding money has decreased.
3. Temporary decrease in the demand for money:



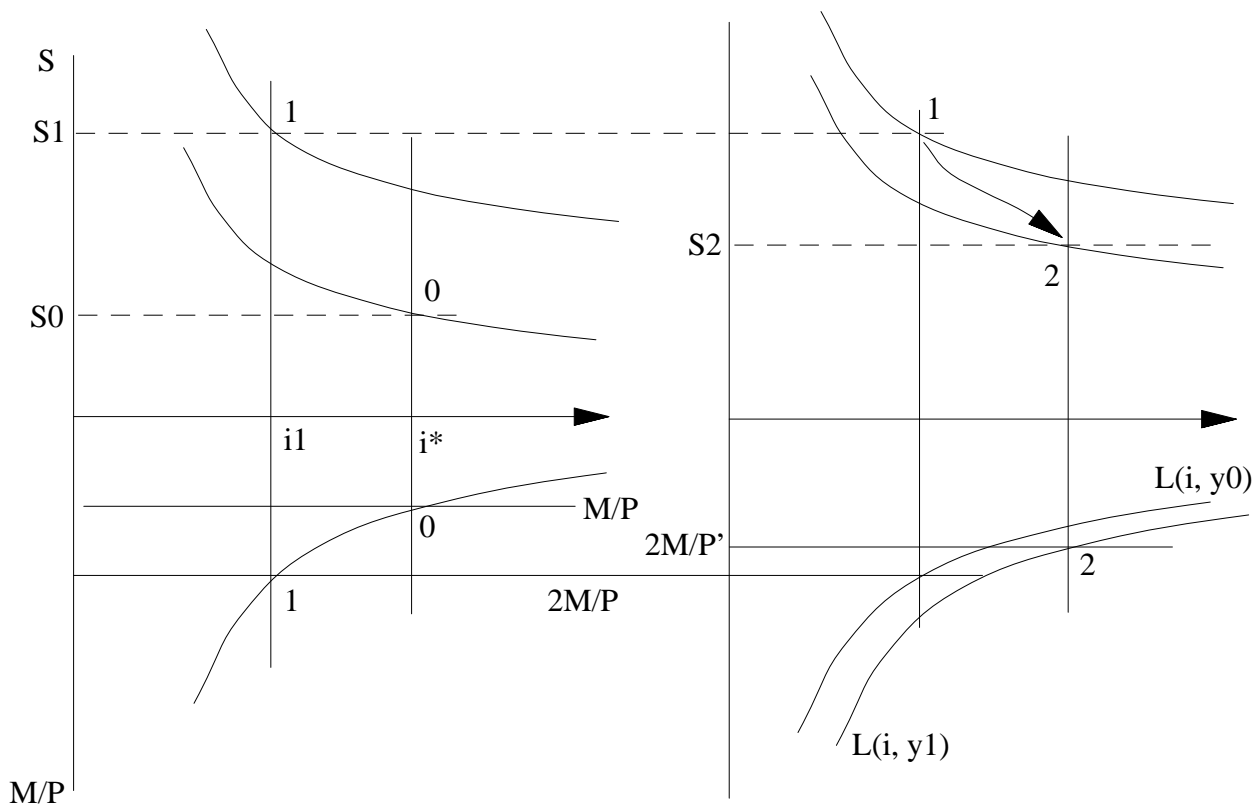
This temporary decrease is represented by the inward shift of the money demand curve in the diagram above. M^S is given and the price level is also fixed in the short run so there is no change in money supply and the shift in money demand necessitates a decrease in the interest rate from i^* to i_1 in order to keep demand equal supply in the money market. As for the exchange rate, the lower domestic return implies via interest parity that S must increase from S_0 to S_1 (= depreciation) because only then will the expected future appreciation lower the foreign return to domestic levels.

Permanent decrease in the demand for money (see diagram below):

Again the money demand curve shifts to the left lowering the interest rate from i^* to i_1 initially. But now the price level will increase over time and according to purchasing power parity (PPP) also the exchange rate (the price of foreign currency if you like). So in the new long run equilibrium we have a new higher exchange rate S_2 (the domestic currency has depreciated). To maintain interest parity initially at the temporarily low domestic interest rate i_0 the exchange rate must overshoot its new long term equilibrium level. So immediately after the shock we have the high exchange rate S_1 while the price level has not moved yet. During the transition period prices start rising thereby decreasing the real money supply and we move along the new money demand curve from point 1 to point 2 back to the old world interest level i^* . At the same time the exchange rate slowly drops to its new long term equilibrium level S_2 and we move from point 1 to point 2 in the interest parity diagram. So in the long run the exchange rate and the price level have increased while the interest rate is again the world interest rate i^* .



4. a)



The money supply doubles and drives down the interest rate from i^* to i_1 . In the long run this will increase prices but by less than 100% because output increases from y_0 to the full employment level y_1 and with it money demand increases. According to PPP the exchange rate also increases by less than 100% in the long run. But in the short run there will be a higher exchange rate to maintain interest parity inspite of the temporarily low domestic interest rate i_1 . Whether the exchange rate will overshoot to more or less than twice its original level cannot be said since the model does not indicate the exact extent of the overshooting effect. But in the long run S_2 will be less than twice S_0 in line with the change in the price level.

b) If we start at a lower interest rate (and higher exchange rate) the initial increase in the exchange rate will be less pronounced. In the long run the rate of depreciation of the domestic currency will again fall short of the rate by which the quantity of money increased.