Adding Money to the Model

The Quantity Theory only focuses on money as a medium of exchange. Before incorporating money into our Dynamic General Equilibrium model, we want to generalize our theory of money demand to recognize its store of value function. In particular, money demand will be a decreasing function of the nominal interest. Since money doesn't pay interest, when interest rates rise the opportunity cost of holding money increases. As a result, household's economize on their holding of money. Thus we can write

$$M^d = P \cdot L(\overset{+}{Y}, \overset{-}{R})$$

} Note, money demand is proportional to the price level. Money is demanded for what it can buy. Hence it is a demand for **real balances**

From the Fisher Eq., $R = r + i$

nominal   real   inflation

For now we can normalize $i = 0$ and simply write,

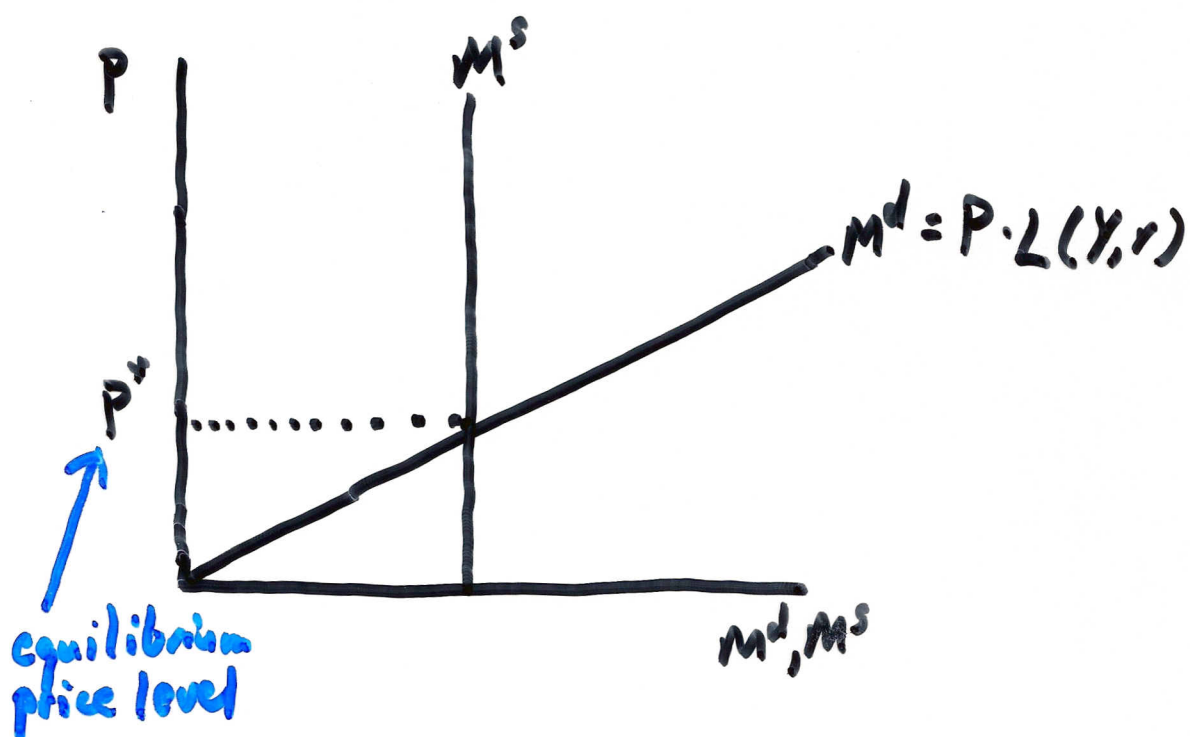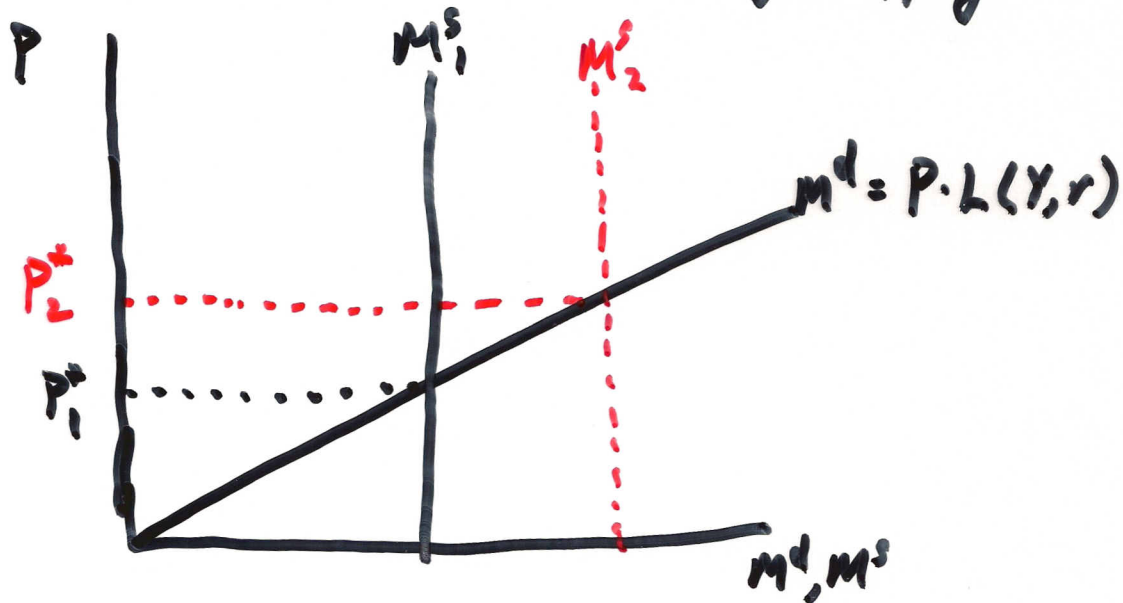$$R = r \implies \boxed{M^d = P \cdot L(Y, r)}$$

We can now depict equilibrium in the money market as follows:

The money supply curve is drawn vertical, since we assume the money supply is exogenous (i.e, it is determined by the Central Bank).
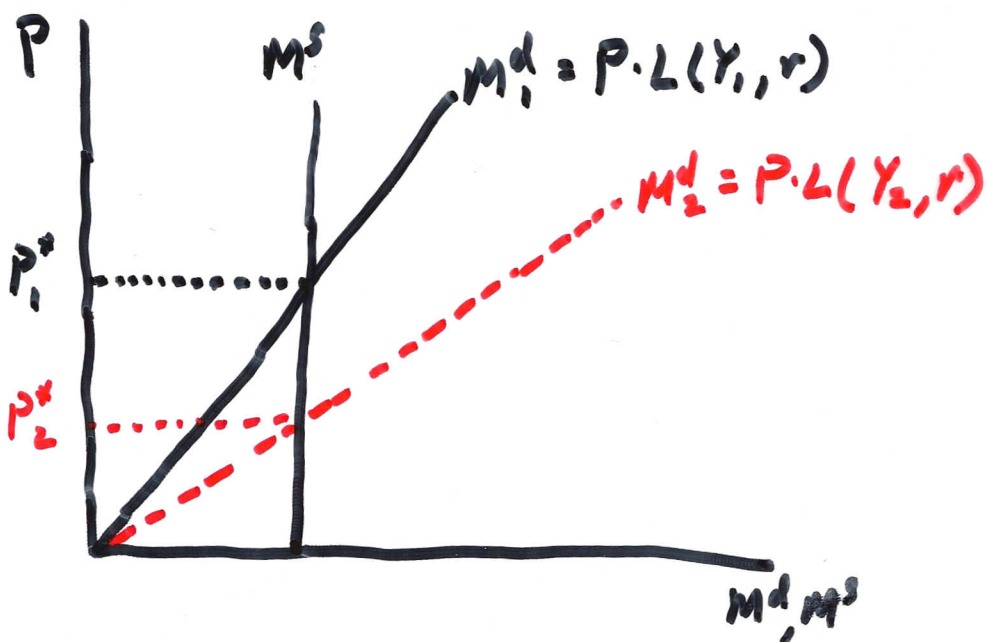
Comparative Statics

① An Increase in the Money Supply

P (vertical axis), M_1^s, M_2^s

$M^d = P \cdot L(Y, r)$

P_2^*, P_1^*

M^d, M^s (horizontal axis)

$$M^s \uparrow \implies P \uparrow$$

②. An Increase in Output

P (vertical axis), M^s

$M_1^d = P \cdot L(Y_1, r)$

$M_2^d = P \cdot L(Y_2, r)$

P_1^*, P_2^*

M^d, M^s (horizontal axis)

$$Y \uparrow \implies P \downarrow$$

The Monetary Intertemporal Model

Now have 3 markets to keep track of: (1) The Labor Market, (2) The Goods Market, and (3) The Money Market.
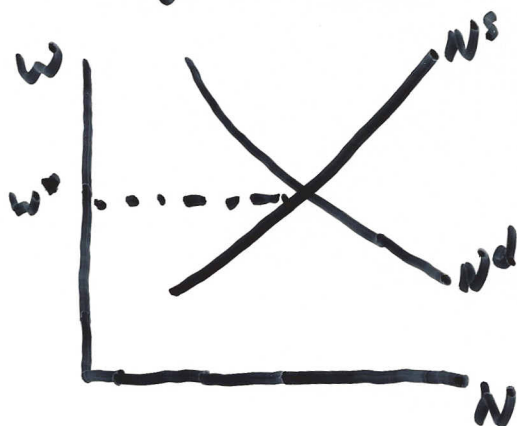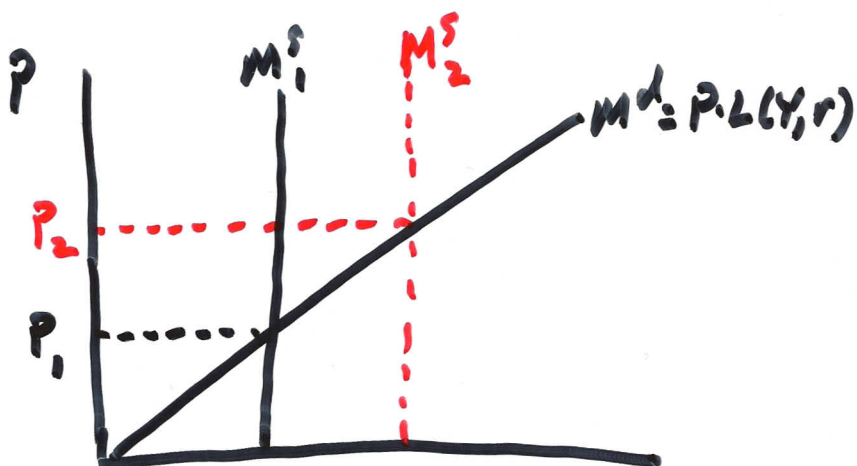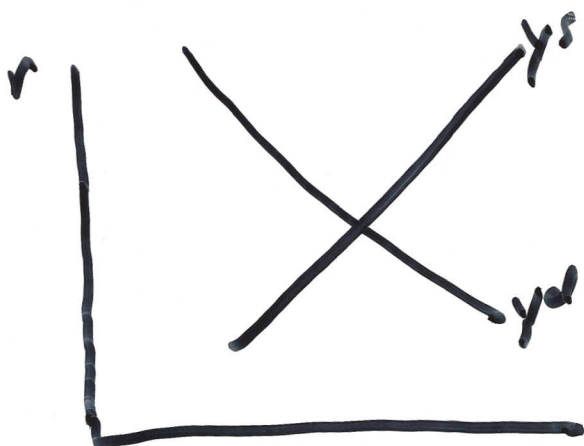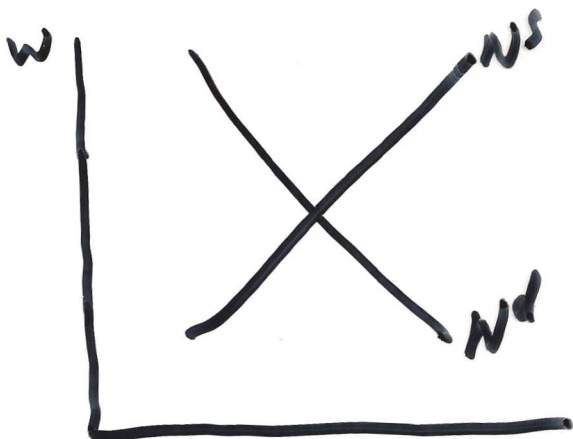

Labor Market
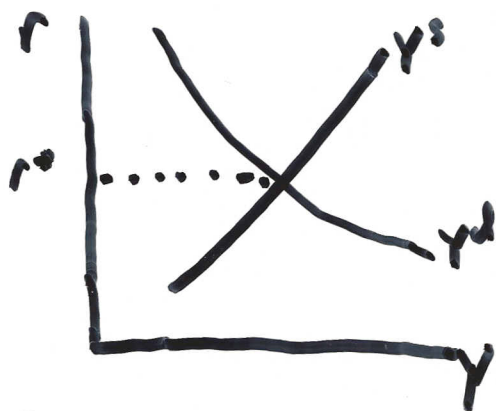
Goods Market

Money Market

$M^d: P \cdot L(Y, r)$
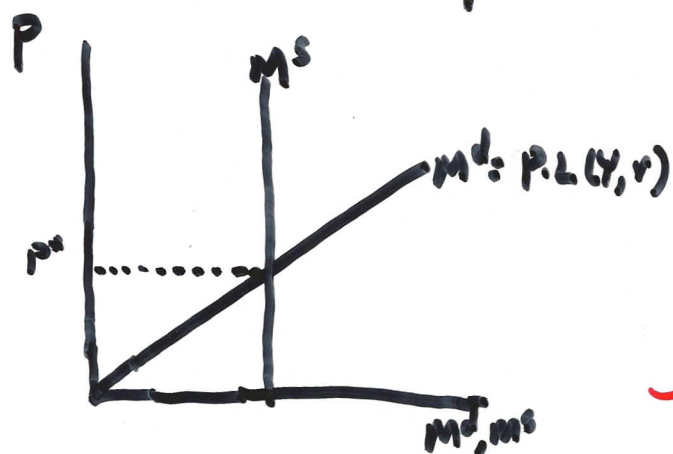
Note that (for now) our task is simplified because causation runs in one direction. Although developments in the Labor and Goods markets influence the Money market, developments in the Money market do not influence the Labor + Goods markets. (This will change later).
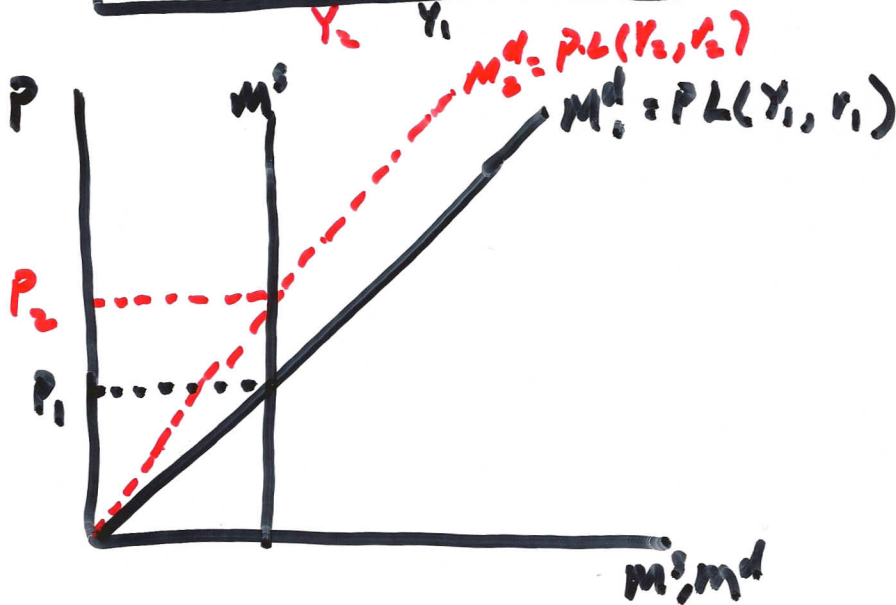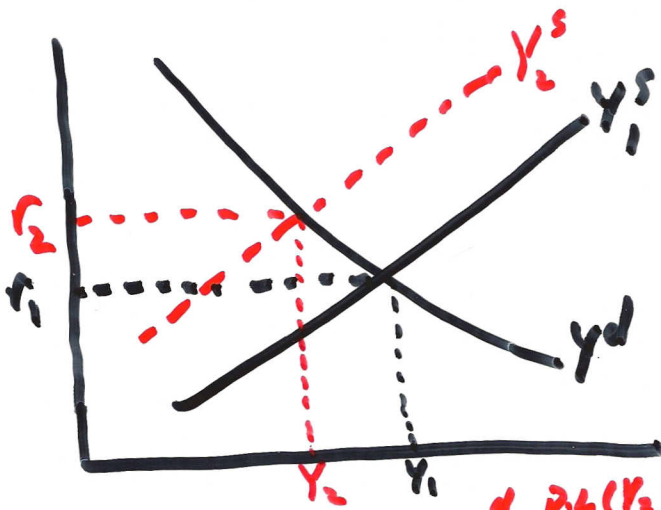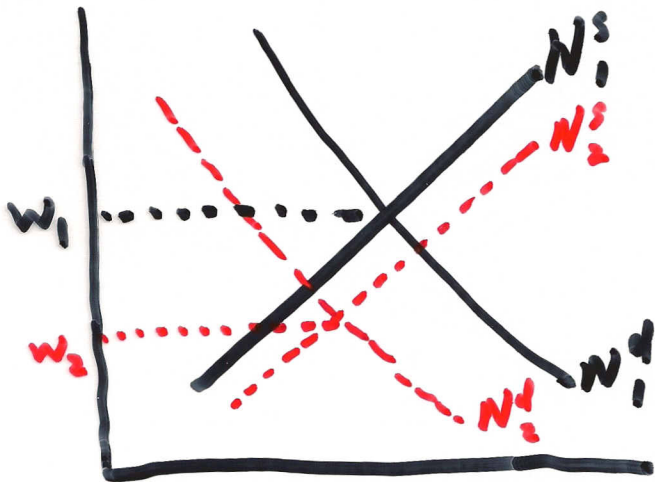
Comparative Statics

① An Increase in the Money Supply

$M^s \uparrow \Rightarrow P \uparrow$, No Change in "real" variables

②. Temporary Decrease in Productivity ($z\downarrow$)

N_1^S

N_2^S

W_1

W_2

N_1^d

N_2^d

Y_2^S

Y_1^S

r_2

r_1

y^d

Y_2

Y_1

P

M^S

$M_2^d = PL(Y_2, r_2)$

$M_1^d = PL(Y_1, r_1)$

P_2

P_1

M^S, M^d

$z\downarrow \text{(temporary)} \implies P\uparrow$

③ Central Bank Stabilizes the Price Level

Suppose there is a recession ($Y\downarrow$), which causes money demand to shift left. Suppose the Central Bank stabilizes the price level.

In the graph: M_2^s, M_1^s, $M_2^d = P \cdot L(Y_2, r)$, $Y_2 < Y_1$, $M_1^d = P \cdot L(Y_1, r)$, P_2, P_1
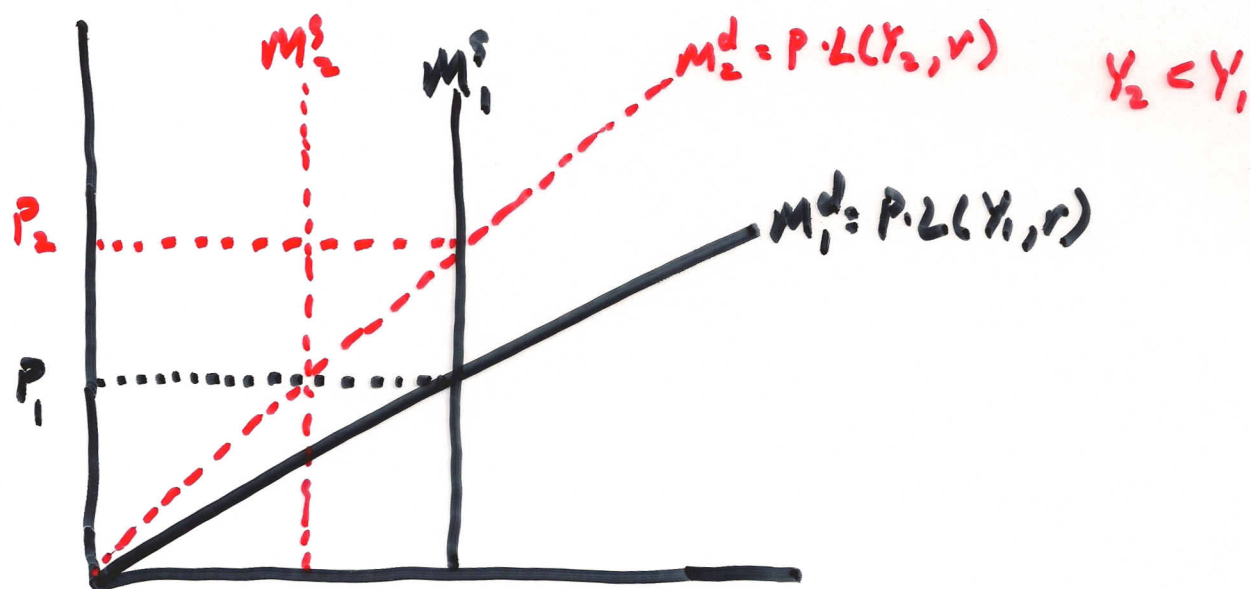
With a passive Central Bank, the recession would cause inflation (price level increase to P_2).

An active, price-level stabilizing, Central Bank would prevent the price level from increasing by **decreasing the money supply**

(In this simple model there is no risk from doing this, and there could be some benefit. However, ~~when~~ if money has real effects, then a monetary contraction during a recession could be disastrous!)