1.

The model is

$$
\begin{aligned}
Y &= C(Y-T) + I(r) + G + X(e,Y), && (1)\\
\frac{M}{P} &= L(r,Y), && (2)\\
X(e,Y) &= F(r). && (3)
\end{aligned}
$$

Plug (3) into (1) and together with (2) we can get two curves with respect to r and Y. For the equation (1), i.e. the IS equation,

$$
\frac{\partial r}{\partial Y} = -\frac{C' - 1}{I' + F'} < 0,
$$

For the equation (2), i.e. the LM equation,

$$
\frac{\partial r}{\partial Y} = -\frac{L_2}{L_1} > 0,
$$

in which $L_1 \equiv \partial L/\partial r$, $L_2 \equiv \partial L/\partial Y$. Therefore, we get a downward-sloping IS curve and an up-sloping LM curve, whose intersection determines the equilibrium state (r^*, Y^*). Then we can find the exchange rate in the equilibrium through (3).

When there is a decline in investment sentiment, which implies for every r, $I(r)$ decreases, the IS curve shifts to the left. This results in both lower output and interest rate. And a lower r^* means a higher $F(r^*)$. To satisfy (3), X must be higher. With $\partial X/\partial Y < 0$ and $\partial X/\partial e < 0$, we can not conclude how the exchange rate changes.

2.

(a)

Plug in all the expressions into the IS and LM equation:

$$
\begin{cases}
Y = a + b\cdot(Y-T) + d - e\cdot r + G\\
\dfrac{M}{P} = M_0 + f\cdot Y - g\cdot r
\end{cases}
$$

Eliminating r, we then get the AD curve:

$$
e\left(M_0 + f\cdot Y - \frac{M}{P}\right) = g(a + d + G - Y) + g\cdot b(Y-T).
$$

(b)

When there is a negative shock to the investment sentiment, the AD curve becomes

$$e \cdot \frac{M}{P} = (g(1-b) + e \cdot f)\, Y + e \cdot M_0 - g(a + d - d_0 + G - b \cdot T)$$

which shows a decline in the intercept. Meanwhile,

$$\frac{\partial P}{\partial Y} = -\frac{e \cdot f + g - g \cdot b}{e \cdot M} \cdot P^2 < 0,$$

which means that the AD curve is downward-sloping. Therefore, the AD curve shifts to the left by $d_0 \cdot g/(g(1-b) + e \cdot f)$.

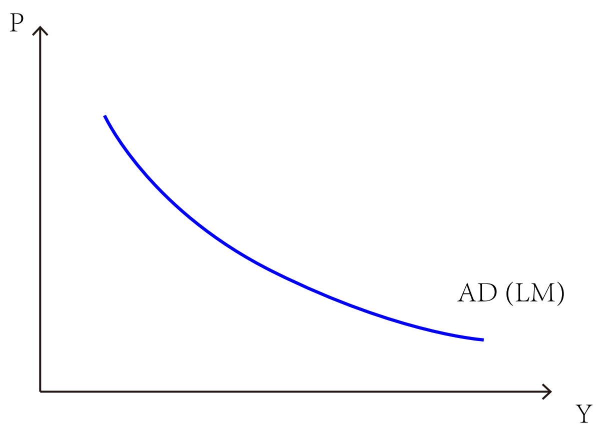
3.

(a)

The model is

$$\begin{aligned} Y &= C(Y-T) + I(r^*) + G + X(e), \\ \frac{M}{P} &= L(r^*, Y). \end{aligned} \tag{4}$$

Note that P is only subject to equation (4). Therefore, the AD equation is actually the LM equation with an accepted r^*.



(b)

The model is

$$Y = C(Y - T) + I(r^*) + G + X(e^*), \tag{5}$$

$$\frac{M}{P} = L(r^*, Y). \tag{6}$$

Note that in equation (5), Y is determined, which implies L is also determined in (6). P and M adjust to satisfy equation (6). Therefore, the AD curve is a straight line.