Practice Problems - Set A

Answer Key

This comprehensive practice set covers Chapters 16-18 of Feenstra & Taylor. Work through all questions to prepare for Midterm 2.

1. (15 points) BOP Transactions

   Show how each of the following would affect the U.S. balance of payments. Include a description of the debit and credit items, and in each case identify which specific account is affected (e.g., imports of goods and services, IM; exports of assets, EX^A; net factor income from abroad, NFIA; and so on).

   (a) A New York bank purchases a $100 million bond issued by the German government, paying with a check drawn on its account at a Frankfurt bank.

Description	BOP account	Account detail	Credit/Debit
German bond imported to US	FA ↑	IM^A ↑	-$100M
Decrease in US-owned deposits in Germany	FA ↓	IM^A ↓	+$100M

The bond purchase represents a U.S. acquisition of a foreign asset, which is recorded as a debit in the financial account. Payment comes from reducing the bank's deposits in Frankfurt (also a U.S.-owned foreign asset), which appears as a credit. The net effect on the financial account is zero, as one foreign asset is exchanged for another.

   (b) A French tourist spends $5,000 on a vacation in Florida, paying with a credit card issued by a U.S. bank.

Description	BOP account	Account detail	Credit/Debit
Tourism services exported to France	CA ↑	EX ↑, TB ↑	+$5,000
Increase in French liability to US bank	FA ↓	IM^A ↑	-$5,000

The tourism services provided to the French visitor count as a U.S. export, recorded as a credit in the current account's trade balance. The credit card creates a liability owed by the French tourist to the U.S. bank, which represents a U.S. acquisition of a foreign asset (the French tourist's IOU), recorded as a debit in the financial account.

   (c) A U.S. company receives $20 million in dividends from its subsidiary in Mexico. The funds are deposited in a Mexican bank account owned by the U.S. company.

Description	BOP account	Account detail	Credit/Debit
Dividend income from Mexico	CA ↑	NFIA ↑, EX^{FS} ↑	+$20M
Increase in Mexican deposits owned by US	FA ↓	IM^{A} ↑	-$20M

Dividends earned on the U.S. company's Mexican subsidiary represent income from capital invested abroad, recorded as a credit in the current account under net factor income from abroad (NFIA). Since the funds remain in Mexico (deposited in a Mexican bank), this represents an increase in U.S.-owned foreign assets, recorded as a debit in the financial account.

2. (12 points) National Income Identities

Consider the following data for a country (all values in billions of dollars):

- GDP = 5,000
- Consumption (C) = 3,200
- Investment (I) = 800
- Government spending (G) = 1,100
- Net factor income from abroad (NFIA) = -50
- Net unilateral transfers (NUT) = -20

(a) Calculate GNE, GNI, and the trade balance (TB).

Gross National Expenditure:

$$GNE = C + I + G = 3,200 + 800 + 1,100 = 5,100 \text{ billion}$$

Gross National Income:

$$GNI = GDP + NFIA = 5,000 + (-50) = 4,950 \text{ billion}$$

Trade Balance: Using the national accounts identity, the trade balance equals GDP minus domestic absorption:

$$TB = GDP - GNE = 5,000 - 5,100 = -100 \text{ billion}$$

The country runs a trade deficit of $100 billion, meaning it imports more goods and services than it exports.

(b) Calculate the current account (CA) and interpret the result.

The current account combines the trade balance, net factor income, and net transfers:

$$CA = TB + NFIA + NUT = -100 + (-50) + (-20) = -170 \text{ billion}$$

Interpretation: The country has a current account deficit of \$170 billion, indicating it's spending more on goods, services, and transfers than it's earning from production and factor income. This deficit must be financed either by borrowing from abroad (capital inflows) or by running down external wealth.

The deficit has three components: a \$100 billion trade deficit, \$50 billion in net factor payments to foreigners (paying more income to foreign factors of production than receiving from abroad), and \$20 billion in net transfers sent abroad.

3. (10 points) Consumption Smoothing

Consider a two-period endowment economy. A representative household receives income $Q_0 = 100$ in period 0 and $Q_1 = 121$ in period 1. The world interest rate is $r^* = 0.10$. The household has preferences $U = \min(C_0, C_1)$ (perfect complements). There is no initial wealth: $W_{-1} = 0$.

(a) What is the optimal consumption in each period?

With perfect complements, the household wants perfectly smooth consumption: $C_0 = C_1 = C$.

The long-run budget constraint is:

$$C_0 + \frac{C_1}{1+r^*} = Q_0 + \frac{Q_1}{1+r^*}$$

Substituting $C_0 = C_1 = C$:

$$C + \frac{C}{1.10} = 100 + \frac{121}{1.10}$$

$$C\left(1 + \frac{1}{1.10}\right) = 100 + 110$$

$$C \times \frac{2.10}{1.10} = 210$$

$$C = 210 \times \frac{1.10}{2.10} = 110$$

Optimal consumption: $C_0 = C_1 = 110$

(b) What is the trade balance in each period?

The trade balance in each period equals income minus consumption (GDP minus GNE):

$$TB_0 = Q_0 - C_0 = 100 - 110 = -10$$

$$TB_1 = Q_1 - C_1 = 121 - 110 = 11$$

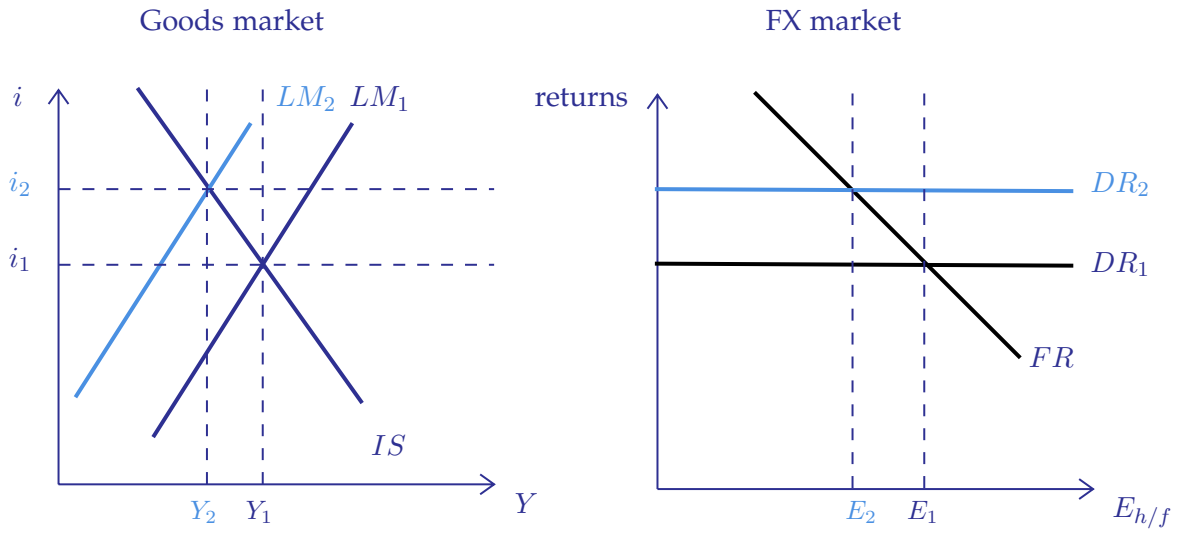
The household borrows 10 in period 0 to smooth consumption above its current income. In period 1, it repays the principal plus interest: $10 \times 1.10 = 11$. This exactly matches TB_1, reflecting the intertemporal budget constraint.

4. (15 points) IS-LM-FX Model - Monetary Policy

Consider a small open economy described by the IS-LM-FX model under a floating exchange rate regime. Initially, the economy is in equilibrium. The central bank unexpectedly decreases the money supply.

(a) Draw IS-LM and FX diagrams showing the initial equilibrium and the new equilibrium. Label all curves and equilibrium points clearly.

A decrease in the money supply shifts the LM curve to the left, from LM_1 to LM_2.



(b) State the effect on the following variables: Y, i, $E_{h/f}$, C, I, TB.

The monetary contraction has the following effects:

- $Y \downarrow$ (output falls as the economy contracts)
- $i \uparrow$ (interest rate rises to equilibrate the money market)
- $E_{h/f} \downarrow$ (currency appreciates due to higher interest rates attracting capital inflows)
- $C \downarrow$ (consumption falls with lower income)

- $I \downarrow$ (investment falls due to higher borrowing costs)
- $TB \downarrow$ (trade balance worsens as the currency appreciation makes exports more expensive and imports cheaper)

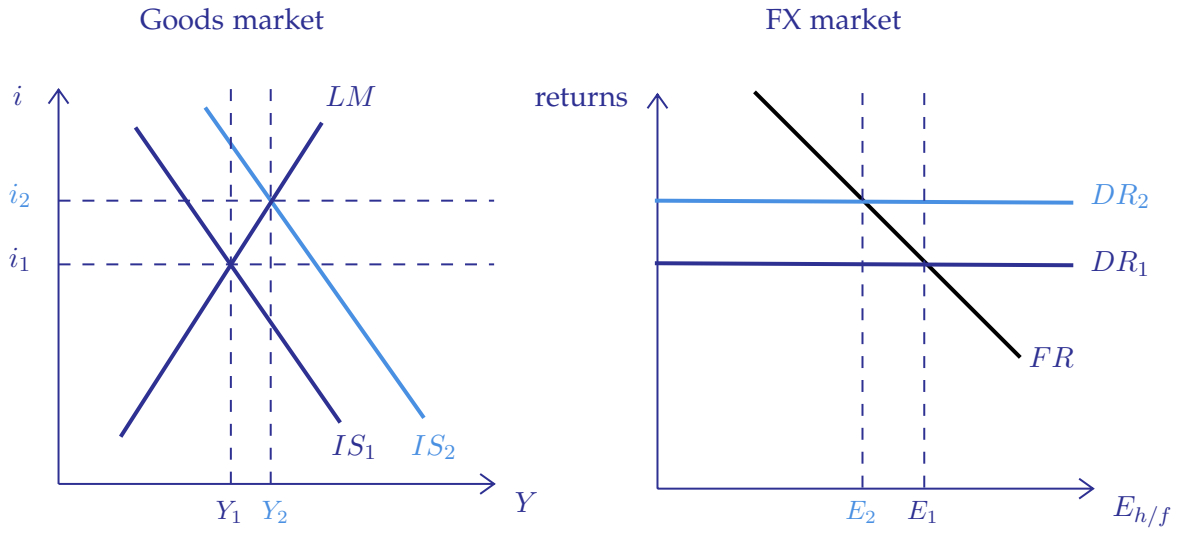
All variables move in contractionary directions. The appreciation reinforces the recession by hurting international competitiveness.

5. (15 points) IS-LM-FX Model - Fiscal Policy

Consider the same economy as in the previous question. Now suppose the government increases spending ($G \uparrow$) under a floating exchange rate.

(a) Draw IS-LM and FX diagrams. State the effect on Y, i, $E_{h/f}$, C, I, TB.

An increase in government spending shifts the IS curve to the right, from IS_1 to IS_2.



The fiscal expansion generates the following effects:

- $Y \uparrow$ (output increases from higher aggregate demand)
- $i \uparrow$ (interest rate rises as money demand increases with higher output)
- $E_{h/f} \downarrow$ (currency appreciates due to capital inflows attracted by higher interest rates)
- $C \uparrow$ (consumption rises with higher income)
- $I \downarrow$ (investment is crowded out by higher interest rates)
- $TB \downarrow$ (trade balance worsens due to currency appreciation reducing competitiveness)

While fiscal policy successfully expands output, there is significant crowding out through two channels: the interest rate effect on investment, and the exchange rate effect on the trade balance.

(b) Compare the effectiveness of fiscal policy under floating versus fixed exchange rates. Which regime leads to a larger increase in output for the same increase in G?

Under fixed exchange rates, fiscal policy is more effective. To maintain the peg after the fiscal expansion raises interest rates, the central bank must increase the money supply (shifting LM right). This monetary accommodation prevents crowding out: interest rates don't rise as much, so investment doesn't fall. The exchange rate stays fixed, so there's no appreciation to hurt the trade balance. The output increase is larger.

Under floating exchange rates, the interest rate rise crowds out investment, and the currency appreciation crowds out net exports. These offset some of the fiscal stimulus, resulting in a smaller output multiplier.

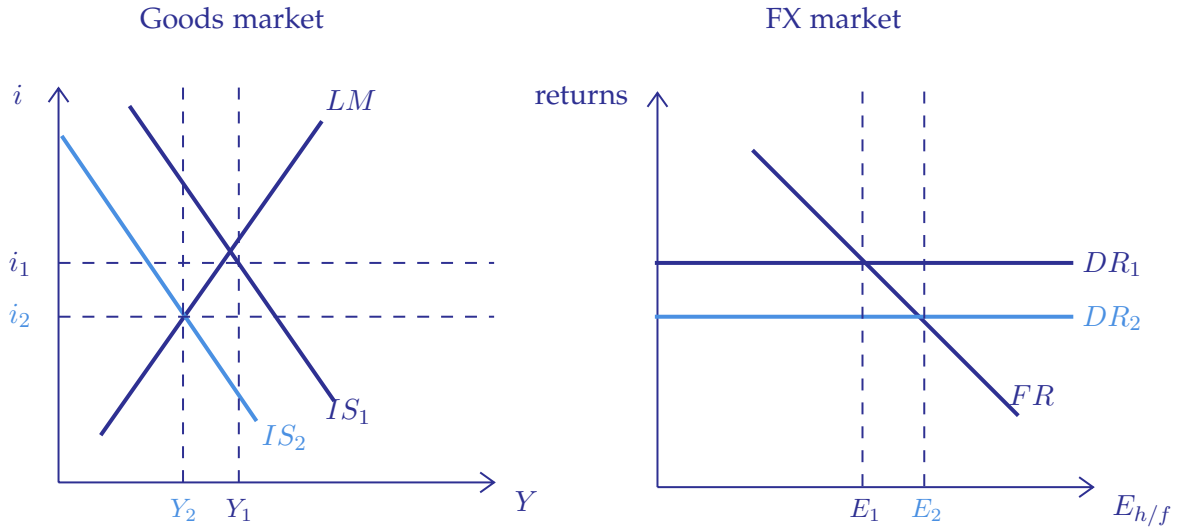
Conclusion: Fiscal policy has a larger effect on output under fixed exchange rates because the necessary monetary accommodation to defend the peg eliminates crowding out. Under floating rates, crowding out substantially reduces the fiscal multiplier.

6. (12 points) IS-LM-FX: Investment Shock and Policy Response

Suppose U.S. firms become pessimistic about future profitability and cut investment expenditure autonomously (i.e., independently of the interest rate). The economy operates under a **floating exchange rate** and the government makes **no policy response** in part (a).

(a) How does the investment shock affect the IS curve? Using an IS-LM-FX diagram, show the effects on Y, i, $E_{h/f}$, C, I, and TB.

A fall in autonomous investment reduces aggregate demand at every interest rate, shifting the IS curve **left**.



Effects:

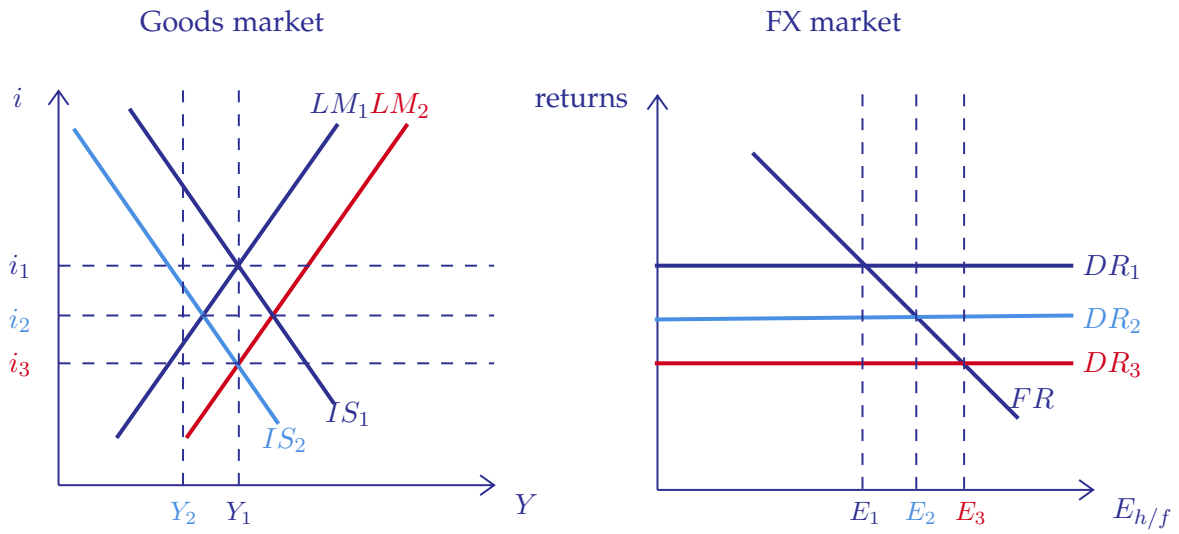
- $Y \downarrow$: IS shifts left, output falls

- $i \downarrow$: interest rate falls (movement along LM)
- $E_{h/f} \uparrow$: lower i shifts DR down, currency **depreciates**
- $C \downarrow$: falls with income
- $I \downarrow$: falls from both the autonomous drop and the lower interest rate partially offsetting — net effect is still negative since the autonomous fall dominates
- $TB \uparrow$: depreciation improves competitiveness; lower income also reduces imports. Both channels improve the trade balance.

The depreciation provides automatic stabilization, partially cushioning the output fall, but cannot fully offset it. Note that the trade balance improvement is unambiguous here: unlike a demand shock where income and exchange rate effects can work in opposite directions, both channels move TB in the same direction.

(b) Now suppose the central bank wants to **stabilize output** at its original level Y_1 using monetary policy. What must it do? Show the effects on Y, i, $E_{h/f}$, and TB relative to the no-policy case in part (a).

To restore output to Y_1, the central bank must expand the money supply ($M \uparrow$), shifting LM **right**. This lowers the interest rate further and causes additional depreciation, stimulating the trade balance and investment enough to offset the original investment shock.



Effects of monetary stabilization (red), relative to no-policy case (blue):

- Y: restored to Y_1 (stabilization achieved)
- $i \downarrow\downarrow$: falls further to $i_3 < i_2$
- $E_{h/f} \uparrow\uparrow$: depreciates further to $E_3 > E_2$ (DR shifts down further to DR_3)

- TB $\uparrow\uparrow$: improves further relative to the no-policy case, as the larger depreciation boosts competitiveness

Monetary policy successfully stabilizes output by working *with* the automatic depreciation rather than against it. The trade-off is a lower interest rate and a more depreciated currency than in the original equilibrium.

(c) Instead of monetary policy, suppose policymakers use **fiscal policy** ($G \uparrow$) to stabilize output. Compare the effects on i, $E_{h/f}$, and TB to the monetary policy response in part (b). Which policy is more desirable if policymakers are also concerned about the current account deficit?

Fiscal expansion shifts IS back right, restoring output to Y_1. Unlike monetary policy, which lowers i and depreciates the currency, fiscal expansion *raises* i and causes *appreciation*.

	After shock (no response)	Monetary policy ($M \uparrow$)	Fiscal policy ($G \uparrow$)
Y	$Y_2 < Y_1$	Y_1 (restored)	Y_1 (restored)
i	$i_2 < i_1$	$i_3 < i_2$ (falls further)	i_1 (returns to original)
$E_{h/f}$	$E_2 > E_1$ (depreciated)	$E_3 > E_2$ (depreciates more)	E_1 (returns to original)
TB	improves	improves further	returns to original

Policy comparison:

- **Monetary policy** stabilizes output while further improving the trade balance through depreciation. It does not crowd out investment (interest rate falls). However, it may be constrained by the zero lower bound if i is already near zero.
- **Fiscal policy** stabilizes output but appreciates the currency, returning TB to its original level with no net improvement. It also raises the interest rate, crowding out private investment.

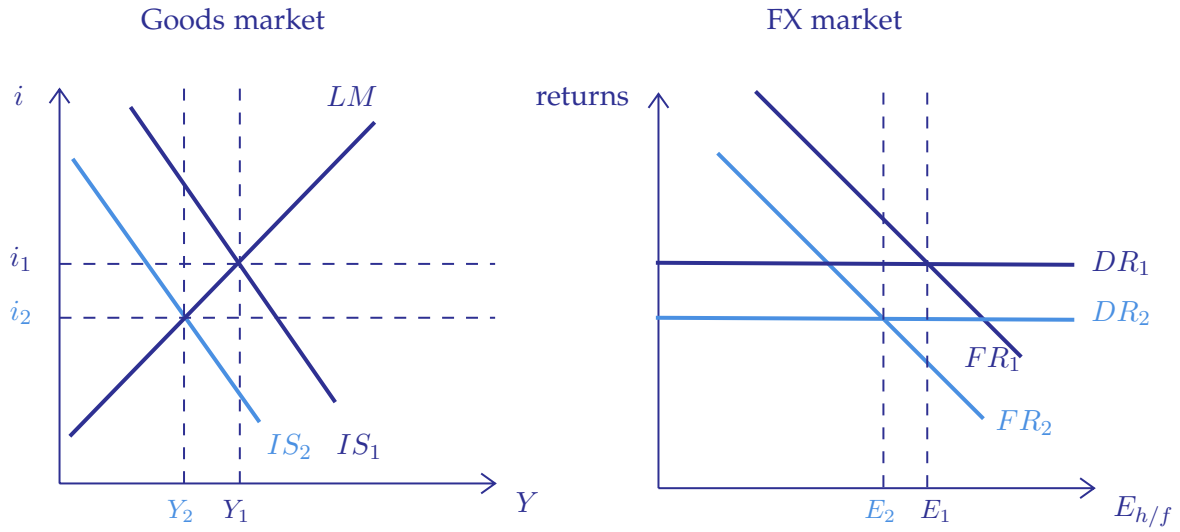
If policymakers are concerned about the current account: monetary policy is more desirable. The depreciation it induces improves the trade balance, whereas fiscal policy's appreciation offsets the trade balance gains from lower income. This was precisely the tension in the 2001 U.S. policy debate: the Fed favored monetary easing to stimulate growth without worsening the current account deficit, while tax cuts (fiscal expansion) risked appreciation and further external imbalance.

7. (10 points) Expected Exchange Rate Changes

Investors expect the home currency to appreciate in the future (expected future $E^e_{h/f} \downarrow$). Analyze the effects under a floating exchange rate regime.

(a) Draw IS-LM-FX diagrams and state the effects on all variables (Y, i, $E_{h/f}$, C, I, TB).

When investors expect future appreciation (expected future $E^e_{h/f} \downarrow$), the FR curve shifts left because foreign assets become less attractive relative to holding home currency.



In the FX market: FR shifts left from FR_1 to FR_2 (expected appreciation makes foreign assets less attractive); Spot exchange rate appreciates immediately: $E_1 \to E_2$, so $E_{h/f} \downarrow$

In the goods market: Spot appreciation reduces export competitiveness, shifting IS left from IS_1 to IS_2; Output falls: $Y_1 \to Y_2$ ($Y \downarrow$); interest rate falls: $i_1 \to i_2$ ($i \downarrow$) (moving along LM), this lowers DR from DR_1 to DR_2.

Summary:

- $Y \downarrow$ (output falls)
- $i \downarrow$ (interest rate falls)
- $E_{h/f} \downarrow$ (currency appreciates)
- $C \downarrow$ (consumption falls with lower income)
- $TB \downarrow$ (trade balance worsens from appreciation)
- $I \uparrow$ (investment rises due to lower interest rates) — note this last effect does not trigger a shift in the IS curve as the changing variable is in the axes.

Intuition: Expected future appreciation becomes self-fulfilling. The anticipation alone triggers immediate appreciation, which then depresses the economy through reduced competitiveness.

(b) Explain the economic intuition: why does an expected future appreciation affect the current economy?

Financial mechanism: When investors expect the home currency to appreciate in the future, holding home currency becomes more attractive (they'll benefit from the appreciation). This increases current demand for home currency, causing immediate appreciation even before the expected event occurs.

Real economic impact: A spot appreciation makes home goods relatively expensive, reducing exports and increasing imports. This lowers aggregate demand and output today.

Policy implication: Exchange rate expectations are powerful. Central banks often use forward guidance to manage expectations precisely because expectations about future rates affect current economic conditions. If a central bank can credibly commit to preventing appreciation, it can avoid some of these contractionary effects.

8. (8 points) Open Economy vs. Closed Economy

   (a) Explain why the effect of a decrease in interest rates on output is stronger in an open economy compared to a closed economy.

In a closed economy, a decrease in interest rates affects output through one main channel:

- Lower i reduces the cost of capital
- Investment increases: $I \uparrow$
- Higher investment raises aggregate demand and output

In an open economy, there's an additional powerful channel:

- Lower i makes domestic assets less attractive
- Capital flows out, seeking higher returns abroad
- Currency depreciates: $E_{h/f} \uparrow$
- Depreciation makes exports cheaper and imports more expensive
- Trade balance improves: $TB \uparrow$
- This further boosts aggregate demand

The open economy benefits from both the investment channel and the exchange rate/competitiveness channel, making monetary policy more powerful. This is why the IS curve is typically flatter (more interest-sensitive) in open economies. (One way to add to this answer is to plot the IS-LM figure with a flatter IS curve for open economies and check that the same shift in the LM leads to a higher output.)

   (b) If a country's exports and imports are very price-inelastic (insensitive to exchange rate changes), would you expect a large or small difference between open and closed economy responses? Explain.

If trade flows are price-inelastic, the exchange rate channel becomes weak. Depreciation wouldn't significantly increase export volume or decrease import volume.

In this case, the difference between open and closed economy responses would be small. The interest rate would still affect investment (same as in a closed economy), but the additional boost from trade balance improvements would be minimal.

Countries heavily dependent on oil exports or essential imports often face this situation. Their trade volumes respond more to income levels than to relative prices, making the exchange rate a less effective stabilization tool. These economies behave more like closed economies in terms of monetary policy transmission.