Topics for Today

1.) Review from Last Time
   - The Foreign Exchange Market
   - Uncovered Interest Parity
   - Monetary & Fiscal Policies with Flexible and Fixed Exchange Rates

2.) Fixed or Flexible?

3.) International Policy Transmission
The Foreign Exchange Market

The FX market is by far the world's largest financial market.

On a typical day, roughly $1.5-2.0 trillion changes hands.

⇒ in less than a week FX transactions exceed the annual value of world trade.

The FX market is a decentralized multiple-dealer market. It never closes!

Most trading is between dealers (about 60-70%).

About 1/2 of inter-dealer trades go through FX brokers.
Major Participants
1.) Commercial Banks
2.) Other financial institutions
3.) Corporations
4.) Central Banks

Leading Trading Centers
1.) London
2.) New York
3.) Tokyo
4.) Frankfurt, Hong Kong, Singapore

Major Instruments
1.) Spot (2 day settlement lag)
2.) Forwards \{ "over-the-counter" markets
3.) Swaps \}

Futures & options also exist, but they are less important.

Most volume is in forwards & swaps (~60%) with swaps being more important than forwards.
Most fx trading takes place in and through the U.S. dollar.

Cross rates are determined by "triangular arbitrage"

\[
\frac{\text{C$}}{¥} = \frac{\text{C$}}{¥} \cdot \frac{$}{¥}
\]

i.e.

\[\text{C$} \]
\[\$ \]
\[¥ \]
The Demand for FX Assets

Like all assets, the demand for foreign currency-denominated assets depends on 3 factors:

1.) Expected (real) returns
2.) Risk
3.) Liquidity

In turn, the expected dollar return on foreign currency assets depends itself on 2 factors:

1.) Their interest rate (or cash flows).
2.) Expected exchange rate changes

Note: When comparing real $ returns on domestic and foreign assets, we can ignore inflation, since it is the same for both.
Uncovered Interest Parity

- Suppose you have some money to invest. You can either invest in Canada or Japan. Suppose all you care about is the expected rate of return.

- We can visualize the 2 investment strategies as follows:

1. Invest in Canada and get \( 1 + r \) per $ invested (\( r \) = Canadian interest rate)

2. Convert \$1.00 to \( e \) ¥ at spot exchange rate
   - Invest the ¥ and get \( e(1+r^*) \) per ¥
   - Convert ¥ back to \$ at the expected future spot exchange rate, \( e^f \)
Uncovered Interest Parity (UIP) just states that these 2 alternative investment strategies offer the same expected return.

\[ 1 + r = e^{(1 + r^*) \frac{1}{e^*}} \]

Re-arranging,

\[ \frac{e^* - e}{e} = \frac{r^* - r}{1 + r} \approx r^* - r \]

Or,

\[ r = r^* - \frac{e^* - e}{e} \]

In words,

\[
\begin{align*}
\text{Domestic Interest Rate} & = \frac{\text{Foreign Interest Rate} - \text{Expected Appreciation of Domestic Currency}}{	ext{Foreign Interest Rate}} \\
\end{align*}
\]

If domestic currency expected to appreciate, then investors are willing to invest domestically even when interest rate is lower!
Flexible Exchange Rates

Fiscal Policy

At B \( r > r_w \)

\( \Rightarrow \) capital inflow

\( \Rightarrow \) Currency Appreciation

\( \Rightarrow \) \( \text{NX} \downarrow \)

\( \Rightarrow \) IS shifts left

\( \Rightarrow \) Return to A

Monetary Policy

At B \( r < r_w \)

\( \Rightarrow \) capital outflow

\( \Rightarrow \) Currency Depreciation

\( \Rightarrow \) \( \text{NX} \uparrow \)

\( \Rightarrow \) IS shifts right

\( \Rightarrow \) Go to C
Fixing the Exchange Rate

Fixing the exchange rate is essentially no different from fixing the price of milk or wheat. In general, the govt. must intervene in the fx market, since there is no guarantee the fixed rate clears the market.

2 Cases

1.) An "overvalued" exchange rate

\[ \frac{e}{e} \]

\[ \text{Supply of } c\$ \quad (\text{Canadian imports}) \]

\[ \text{Demand for } c\$ \quad (\text{Canadian exports}) \]

\[ \text{Excess supply of } c\$ \quad (\text{or excess demand for } e) \]

Govt. must buy c\$ using its fx reserves.

2.) An "undervalued" exchange rate

\[ \frac{e}{e} \]

\[ \text{Supply of } c\$ \]

\[ \text{Demand for } c\$ \]

\[ \text{Excess demand for } c\$ \quad (\text{or excess supply of } e) \]

Govt. must buy fx using its own currency.
Fixed Exchange Rates

Fiscal Policy

At B, $r > r_w$

$\Rightarrow$ capital inflow
$\Rightarrow$ pressure for currency to appreciate
$\Rightarrow$ central bank increases the money supply (buys foreign exchange)
$\Rightarrow$ LM shifts right
$\Rightarrow$ go to C

Monetary Policy

At B, $r < r_w$

$\Rightarrow$ capital outflow
$\Rightarrow$ pressure for currency to depreciate
$\Rightarrow$ central bank must decrease the money supply (sell FX)
$\Rightarrow$ LM shifts left
$\Rightarrow$ return to A
<table>
<thead>
<tr>
<th></th>
<th>Monetary</th>
<th>Fiscal</th>
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<tbody>
<tr>
<td>Flexible</td>
<td>Effective</td>
<td>Ineffective</td>
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<td></td>
<td>(Crowds out $NX$)</td>
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<tr>
<td>Fixed</td>
<td>Ineffective</td>
<td>Effective</td>
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<td>(Monetary Policy must be used to fix the ex. rate)</td>
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Flexible Ex. Rates

IS shocks

Flex. rates insulates economy from IS shocks

LM shocks

Flex. rates accentuate the economy's response to LM shocks
Fixed Ex. Rates

**Fixed rates accentuate the economy's response to IS shocks.**

**Fixed rates insulate the economy from LM shocks.**
USA Monetary Contraction $\Rightarrow$ USA LM shifts left

$\Rightarrow$ $r_{\text{USA}} > r_{\text{Can}}$

$\Rightarrow$ Capital Inflow into USA

Capital Outflow from Canada

$\Rightarrow$ US $\$ Appreciates relative to Canadian $\$

$\Rightarrow$ USA NX ↓

Canadian NX ↑

$\Rightarrow$ USA IS Shifts left

Canadian IS Shifts right

$\Rightarrow$ New Equil. at C
Policy Transmission with Flexible Exchange Rates

**Fiscal Policy**

USA

Canada

USA Fiscal Contraction $\rightarrow$ USA IS shifts left

$\Rightarrow$ $Y_{US} < Y_{Can}$

$\Rightarrow$ Capital outflow from USA
Capital inflow into Canada

$\Rightarrow$ US $\rightarrow$ Depreciates relative to Canadian $\$

$\Rightarrow$ USA $NX \uparrow$
Canadian $NX \downarrow$

$\Rightarrow$ USA IS shifts right
Canadian IS shifts left

$\Rightarrow$ New Equil. at C
Policy Transmission with Fixed Exchange Rates

Monetary Policy

From Canada's perspective, a U.S. Monetary contraction raises the "world" interest rate.

To prevent its currency from depreciating, Canada must also raise its interest rate (by cutting its money supply).

Conclusion

With fixed exchange rates, monetary policy is transmitted "positively," i.e., in the same direction.
From Canada's perspective, a U.S. fiscal contraction lowers the "world" interest rate.

To prevent its currency from appreciating Canada must also lower its interest rate (by expanding the money supply).

Conclusion

With fixed exchange rates, fiscal policy is transmitted "negatively".